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THE AMERICAN GAS LIGHT JOURNAL

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Correspondence.—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

CONTENTS.

An Asterisk (*) denotes an illustrated article.

EDITORIALS—
Briefly Told 469
The World's Columbian Cooking School Exhibit of New York—An Odd Suit at London, England—Mr. Lynn Goes to Detroit, Mich.
Ninth Annual Meeting of the Ohio Gas Light Association—Official Report—Revised by the Secretary 470
First Day, Morning Session—Roll Call—Letters of Regret—Election of New Members—Report of Executive Committee—Annual Report of Secretary and Treasurer—Report of Finance Committee—Report of Committee Appointed to Co-operate with other Gas Associations in an Effort to Bring About Uniformity in Special Castings for Gas Works—An Introduction and a Response—President's Address—Special Committees—The Present State of the Art of Purification in Closed Vessels, by Mr. S. F. Hayward—Discussion—First Day, Afternoon Session—A Test of the Backus Heater, by Mr. Jerome Penn—Discussion—Question No. IV.—"Has anyone had any trouble in purifying water gas with iron sponge?"—Question No. IX.—"What is the best treatment of oxide of iron after it has taken up 35 or 40 per cent. of sulpnur?"
*A Peculiar Gas Electric Accident at Indianapolis, Ind., by Mr. John R. Pearson 478
Powdered Coal in Gas Works, by Mr. N. H. Humphrys 479
ITEMS OF INTEREST FROM VARIOUS LOCALITIES 479
Improvements on the Derby (Conn.) GasWorks—The Mutual Company, Hyde Park, Chicago, Abandons the Manufacture of Fuel Gas—Berlin Iron Bridge Company's Contract—Allowing Massachusetts Companies to Increase their Capital Stock—The Auer Light Company, Montreal, Canada—Proposed Opposition at Salt Lake—Suit Decided Against the Chicago Gas Company—Fuel Gas Company for the Braddock (Pa) District—Mr. J. J. Humphreys Goes to Ottawa, Can.—Annual Meeting, East River (L. I.) Company—The Originator of the Scheme for Carrying Gas Under the East River—Death of Mr. Owen Hitchins—The Economic Company, of Chicago, Loses a Suit—Something from Manistee, Mich.—Will Pawtucket Construct a Municipal Plant—Lighting Company for De Pere, Wis.—Consolidation of Gas and Electric Lighting Interests, Catskill, N.Y.—Director Windrim Favors the Shutting Down of the Ninth Ward Works—Annual Meeting, Middletown, Conn.—And Other Items.
The Market for Gas Securities 482

BRIEFLY TOLD.

THE WORLD'S COLUMBIAN COOKING SCHOOL EXHIBIT OF NEW YORK.—Some weeks ago a hint was given in the JOURNAL to the effect that the New York State Board of Women Managers, World's Columbian Exhibition, had determined to arrange, among other things, for an exhibit to be devoted to displaying modern cooking as it is, and that Miss Juliet Corson, whose devoted and successful labors in the field of teaching how to cook by gas have made her name well known to American gas makers, had been appointed to the executive direction of the scheme. As we understand it, the original idea was that this cooking school should take on the scope of a national affair, with New York as the central figure thereof, in that New York was the first to propose it; but from one cause or another (in all probability mainly from the desire of certain Chicago matrons to have the thing assume an entirely Chicagoese flavor) unity of action was found to be an impossibility, whereupon it was decided by the New York Board to have a separate exhibit, the same to be brought off under the title of the above caption. Mr. Welch, in his annual address to the Ohio Association, makes a very important allusion to the proposed work of Miss Corson and her associates, and in the belief that his thoughts may have counterparts in the minds of other gas makers, we venture to make publication of certain portions of a correspondence between Miss Corson and the JOURNAL respecting this cooking school exhibit. The main reason that the project was not urged—it meant and means the appealing to the gas men of the State, and even to the country—in these columns at an earlier date was the uneven looking state of the preliminaries; or, to put it ruggedly, the petty jealousies of the women threatened to wreck the bark ere the same was launched. However, returning reason seems to have resulted, and we are free to say that the project in its present shape is worthy of support. We think that the gas companies of this State, and the manufacturers of gas apparatus as well, would find it advantageous to get together and appoint a committee to investigate the good policy of raising a fund to be devoted to the purposes for which Miss Corson and her associates are laboring. It is true, the time is short, but the New York Cooking School preliminaries are well underway and are readily explainable by those in charge thereof. Further, it is more than probable that $8,000, or even a smaller sum, would be considered more than a liberal subscription from the gas supply and gas apparatus industries of the State. We have no hesitation in indorsing the project. The correspondence excerpts are given herewith:

WORLD'S COLUMBIAN COOKING SCHOOL EXHIBIT OF NEW YORK,
Miss Juliet Corson, Director,
P. O. Address, Office New York State Board of Women Managers, World's Columbian Exposition,
1122 Broadway, City.

To the Editor AMERICAN GAS LIGHT JOURNAL: I have been delayed in writing to you until the point could be settled of our location at the Chicago Fair. At an Executive Committee meeting held this week, it was decided that New York's Exhibit of Cooking Schools could not be adequately made in the Woman's Building; and, therefore, demand should be made for the restoration of the original space in the Liberal Arts. Our exhibit is to be sole and entire; perfect in itself and untrammeled in any way. * * * I hope that you will see your way

clear toward making immediate and urgent appeals to the gas companies and manufacturers for liberal aid. I send you some printed matter, which may give you some points of information as to the work we shall engage in after the Fair is over. Of course, if I train my pupils to use gas stoves, they are going to demand them always. That goes without saying. If the gas people help me liberally now they will secure my everlasting gratitude. I have invented my gas chafing-dish, and shall introduce it at the Fair. It is a complete little affair that will be wanted by every woman who sees it, and by many men, too, who like hot suppers of their own concoction. * * I have regretted the delay, but it was all at Chicago. They have scared up lions in our path, but we have killed them all, and shall keep at the killing."

We would repeat that the project seems worthy of support, and again suggest that the gas companies and gas apparatus manufacturers of the State come together at once for the purpose of considering ways and means to do their part towards enabling Miss Corson and her associates to show gas for cooking at the Fair at its best.

An Odd Suit at London, England.—Our contemporary, the *Journal of Gas Lighting*, in its issue for March 14, reports a curious action at law, the features of which are so unusual as to warrant our reproducing the main points at issue, as summed up by our contemporary in editorial mention thereof. The *Journal* says: " * * The plaintiff was a resident at Manor Mansions, Belsize Park Gardens, and he occupied, under a lease for a term of 21 years, a residential flat, for which he was to pay £80 a year, inclusive of the rates and taxes. Gas was supplied to the mansions through a large meter at the entrance, and was carried to the different flats, every tenant of which had his own separate meter to register his private consumption. The price of gas in the district being at the time 2s. 9d. per 1,000 cubic feet, the landlords, who collected the rental from the tenants, charged them 3s. per 1,000 cubic feet, which this particular tenant refused to pay. The landlords thereupon cut off his supply; but they were ordered by a Judge in Chambers to restore it. They were now sued for damages for the inconvenience caused to the tenant by this alleged illegal proceeding; and an injunction to restrain them from repeating the interference was also asked for. The plaintiff succeeded in both respects, getting his injunction and 20s. damages with costs on the higher scale. His case was simply that the landlords had no right to cut off his gas, which is a means of obtaining redress specially granted by statute to gas companies, in the public interest, and is not a privilege of landlords or lodging house keepers. It was also argued that the question whether the landlords were in this instance reasonably entitled to make a surcharge of 3d. per 1,000 cubic feet to their tenants upon the gas supplied by the company was one which might be tried in a County Court, and that to impose such a charge, and then cut off the gas if it was not paid, was an arbitrary proceeding. For the defendants, on the other hand, it was argued that they were responsible to the Gas Company for all the gas supplied to the Mansions, and the extra charge was put on to cover the service, expenses and risk which they incurred by reason of their undertaking to supply their tenants at second hand. The question of the reasonableness of this extra charge was not decided by the Judge; but he expressed the opinion that the amount which might be demanded was that which the lessors would have had to pay if the gas rate had not been excepted—which means the rental as charged by the Gas Company. As a matter of policy, it is undesirable that there should be any middleman between the Company and the consumer; and it is hard to see why a lessee of a flat rented at £80 a year should not be dealt with as directly as if he rented a separate house of the same annual value. It may be convenient for the tenants of flats in some cases to pay their gas rental through their landlord; and then the amount of the charge, if any, which the landlord makes for this convenience, may be fairly left to be settled between the parties. But even so, 3d. per 1,000 cubic feet is a pretty profitable commission on such a transaction. It is, however, the way of some landlords of flats to put all sorts of petty extortions upon the tenants: and very possibly the rebellious gentleman in the instance under notice merely 'kicked' at this gas surcharge as representing the proverbial 'last straw.' It is so far satisfactory to have it affirmed on the authority of a Judge of the High Court, that nobody but the Secretary or other duly appointed officer of the statutory Gas Company can wield the thunderbolt known as 'a cutting-off notice.'"

Mr. James T. Lynn has resigned the dual position of Engineer and Superintendent to the Memphis (Tenn.) Gas Light Company, in order to accept a responsible berth under Chief Engineer I. C. Baxter, of the Detroit (Mich.) Consolidated Gas Company.

[Offical Report—Revised by the Secretary.]

NINTH ANNUAL MEETING OF THE OHIO GAS LIGHT ASSOCIATION.

Held at Columbus, Ohio, March 15 and 16, 1893.

First Day—Morning Session.

The Ohio Gas Light Association held its Ninth Annual Meeting in the Employees' Hall of the Columbus (Ohio) Gas Company, commencing at 10 o'clock, A. M., March 15, 1893, the President, Charles H. Welch, of Athens, in the Chair.

ROLL CALL.

The following members were in attendance:

Jos. R. Thomas, N. Y. City.
M. S. Greenough, Cleveland, O.
G. A. Allen, Zanesville, O.
W. H. Anson, Columbus, O.
T. A. Bates, Lima, O.
W. P. Bonney, Erie, Pa.
M. Booth, Bellaire, O.
W. C. Boyle, Salem, O.
I. Butterworth, Columbus, O.
G. N. Clapp, Middletown, O.
J. W. R. Cline, Springfield, O.
M. Coombs, Jr., Youngstown, O.
G. E. Crisp, Elyria, O.
J. Dell, St. Louis, Mo.
R. A. Dittmar, Troy, O.
H. W. Douglas, Ann Arbor, Mich.
E. M. Dundon, Columbus, O.
W. S. Essick, Royersford, Pa.
M. B. Evers, Van Wert, O.
C. R. Faben, Jr., Toledo, O.
H. C. Felt, Cincinnati, O.
M. A. Gemuender, Columbus, O.
W. S. Gribbel, N. Y. City.
O. N. Guldlin, Fort Wayne, Ind.
J. W. Gwynn, Bucyrus, O.
J. Gwynn, Steubenville, O.
H. D. Harper, Chicago, Ill.
J. A. Harris, Philadelphia, Pa.
S. F. Hayward, N. Y. City.
J. S. Hedges, Mansfield, O.
H. L. Hurlburt, Oberlin, O.
T. C. Jones, Jr., Delaware, O.
A. P. Lathrop, Columbus, O.
J. Light, Dayton, O.
H. McCall, Tiffin, O.
G. W. McCook, Steubenville, O.
E. T. McCormack, London, O.
W. McDonald, Albany, N. Y.
J. D. McIlhenny, Philadelphia, Pa.
A. B. Maguire, Urbana, O.
G. Matt, Lancaster, O.
D. S. Milne, Marietta, O.
A. F. Nash, Windsor, Ont.
C. V. Newman, Chicago, Ill.
G. Osius, Detroit, Mich.
J. Penn, Washington C. H., O.
F. R. Persons, N. Y. City.
G. H. Phillips, Hamilton, O.
W. W. Prichard, Ironton, O.
E. Printz, Zanesville, O.
D. T. Roots, Connersville, Ind.
G. D. Roper, Rockford, Ill.
D. R. Russell, St. Louis, Mo.
F. J. Seamon, Uniontown, Pa.
E. D. Sheets, Cleveland, O.
F. H. Shelton, Philadelphia, Pa.
R. Sherrard, Jr., Steubenville, O.
J. H. Smith, Newark, O.
D. C. Spinning, Dayton, O.
F. A. Stacey, Chillicothe, O.
W. Stacey, Cincinnati, O.
J. M. Starr, Richmond, Ind.
J. G. Stephens, Pittsburgh, Pa.
S. S. Stratton, Chicago, Ill.
L. A. Strong, Mansfield, O.
G. H. Tayler, Warren, O.
O. P. Taylor, New Philadelphia, O.
H. D. Timmons, Barnesville, O.
C. H. Welch, Athens, O.
L. Wickham, St. Louis, Mo.
H. Wilkiemeyer, Evansville, Ind.

Letters of Regret.

The Secretary reported that he had received letters and telegrams from the following gentlemen, who expressed regret at their inability to be present:

B. E. Chollar, Geo. T. Thompson, C. M. Higgins, C. H. Dickey, Eugene Vanderpool, Frederick Egner, Jas. Somerville, R. T. Coverdale, W. H. Pearson, J. P. Harbison, A. B. Slater, Jr., Gordon W. Lloyd, Walton Clark, E. C. Brown, and others.

Election of New Members.

The President appointed the following Committee on Application for Membership: J. W. R. Cline, H. L. Hurlburt and D. S. Milne.

Later on this Committee reported favorably upon the following applicants, who were accordingly duly elected to membership:

C. W. Kauke, Sec. Gas Light Co., Wooster, Ohio.
J. J. Clark Sec. Gas Light Co., London, Ohio.
Wm. C. Hedges, Sec. Gas Light Co., Mansfield, Ohio.
J. H. Powell, Vice Pres. Gas Light Co., Upper Sandusky, Ohio.
W. R. Wones, Asst. Supt. Gas Light and Coke Co., Springfield, O.
C. M. McLain, Supt. Gas Co., Massillon, Ohio.
M. C. McVitty, Treas. and Gen. Manager Gas and Electric Co., Kenton, Ohio.
Philip S. Dickey, Western Manager Maryland Meter and Mfg. Co., Chicago, Ill.
Donald McDonald, Pres. Ky. Heating Co., Louisville, Ky.
E. H. Talcott, Sec. and Supt. Gas Light Co., Ashtabula, Ohio.
Alten S. Miller, Manager National Gas Lt. and Fuel Co., Chicago, Ill.

Willard Smyers, Sec. City Gas Works, Hamilton, Ohio.
E. D. Abbott, Supt. Natural Gas Co., Springfield, Ohio.

On motion the reading of the minutes of last meeting was dispensed with.

REPORT OF EXECUTIVE COMMITTEE.

Secretary Butterworth submitted the following report of the Executive Committee:

The Executive Committee has appointed the following Committee on Nominations: Joseph Gwynn, C. R. Faben, Jr., and W.W. Prichard.

The second item of the report is a recommendation that Mr. E. C. Brown, publisher of Progressive Age, be elected to honorary membership in this Association.

The third item is the recommendation that the following members be released from membership, as per their own written requests: R. P. Green, Supt. Gas Works, Ohio Penitentiary; A. J. Stoll, late President of the Gas Co., at Sandusky; R. H. Canby, late Supt. of the Gas Works at Bellefontaine, and Geo. B. Burns, late Supt. Gas Co., Bowling Green, Ky.

The fourth item is the recommendation that the following members be dropped from membership on account of delinquency in the payment of their dues: P. J. Wood, Frank Bierce and James M. Dillon.

On motion, the report of the Executive Committee was adopted. The Secretary then sent to Mr. Brown a telegram, notifying him of his election to honorary membership. Later on the following reply was received:

"Irvin Butterworth, Secretary—Your telegram notifying me of my election to honorary membership in the Ohio Gas Light Association causes me much surprise. I fear the Association is doing me more honor than itself in this selection. I nevertheless appreciate the distinguished compliment, and return my sincere thanks to your Association for conferring this honor upon me. E. C. BROWN."

The Secretary read the following

ANNUAL REPORT OF SECRETARY AND TREASURER.

New members admitted at last meeting	25
Released from membership at last meeting	13
Elected from active to honorary membership	1
Present number of active members	156
Present number of honorary members	11
Number of active members deceased during year	3
Number of badges on hand	30

Financial Report.

Receipts—		
Balance from Secretary last year	$16 18	
Funds from Geo. H. Tayler, Ex-Treasurer	746 22	
Received for 70 badges	210 00	
" from gas journals, for proceedings	133 20	
" as initiation fees and dues	497 00	
Total receipts		$1,602 60
Expenditures—		
Postage	$69 77	
Stationery and printing	153 83	
Badges	300 00	
Expenses of Zanesville exhibit	78 55	
Secretary's salary	300 00	
Reporting 8th annual meeting	133 20	
Expenses of Executive Committee meetings	39 90	
Expressage	11 20	
Telegrams	6 21	
Incidentals	14 02	
Total expenditures	$1,106 68	
Deposit in State Savings Bank	340 00	
Cash on hand	155 92	
		$1,602 60

Respectfully submitted, IRVIN BUTTERWORTH, Sec. and Treas.

The Finance Committee reported as follows:

REPORT OF FINANCE COMMITTEE.

We have examined the books and vouchers of the Treasurer, covering moneys received and disbursed by him during the past year, and find them to be correct. They show a balance in the treasury of $495.92, for which he holds a certificate of deposit of $340, and a certified check of $155.92. Respectfully submitted, G. A. ALLEN, G. N. CLAPP, J. W. R. CLINE, } Finance Committee.

The Secretary—I probably should explain that the expenditures for the past year have been heavier than usual because, as you will notice, of the payment of $300 for badges, and because the report also includes some expenditures that should have been paid the previous year; as, for instance, the expenses of the Zanesville gas stove exhibit.

On motion of Mr. Gwynn, the reports were accepted and ordered filed.

REPORTS OF SPECIAL COMMITTEES.

The President called for the reports of special committees, and the Secretary submitted the following

REPORT OF COMMITTEE APPOINTED TO CO-OPERATE WITH OTHER GAS ASSOCIATIONS IN AN EFFORT TO BRING ABOUT UNIFORMITY IN SPECIAL CASTINGS FOR GAS WORKS.

Gentlemen—Your committee has communicated with all the leading foundries in this section of the country, with reference to their adopting certain standard patterns for special castings used by gas companies, to the end that there might be uniformity in such castings throughout the country. We find a gratifying willingness on the part of all those foundries to co operate to any reasonable extent in such movement, some of them agreeing to adopt the standard patterns at once, if desired, and others agreeing to do so gradually. In this connection, the following letter to the committee from a leading foundryman probably indicates their attitude towards this matter better than the committee can otherwise describe it:

"We certainly are in accord with your efforts to get, if possible, a standard for the specials used for both water and gas purposes. While we are perfectly willing to make any changes to please our patrons, I doubt very much whether any plan could be adopted by your Association that would be indorsed by the different gas companies of this State. Though they may agree to use them, our experience is that each engineer has his own ideas as to the purposes he intends to use castings for, and consequently claims that he is amply able to judge of his wants, irrespective of any agreement, which to my mind he has a perfect right to do. And, then again, all the foundries in the West deal as largely in gas supplies in each State other than Ohio, and these gas companies outside of Ohio should adopt the same standard. I had this matter up a day or so ago with a member of your Association hailing from the southern part of the State, and a remark that he made was that he thought he knew as much about his individual business as any Association did, and should order such castings as he wanted, and should expect to get them. No foundry would be safe in saying to a customer that he should not have such castings as he might order, but must confine himself entirely to the Association pattern. So, you see, it will necessitate a large expense upon the several foundries to comply absolutely with your request, unless all members of your Association will agree absolutely to take the castings in accordance with such styles and shapes as you may elect. I believe, however, that our patterns are very close to the contemplated ones, and would be near enough for all practical purposes. All foundries west of the Allegheny mountains have had this matter up for discussion for some time and we have ventilated it very thoroughly. We are having meetings from month to month, and are to hold one now within a day or two, when I will take the matter up, and we will discuss it from a manufacturer's standpoint, and, if possible, agree upon a united action with a view to complying with your wishes as far as possible; at least I shall so recommend it."

Under the circumstances, the committee feels that it is warranted in reporting that the various foundries throughout this part of the country are ready to adopt standard patterns as soon as gas companies are ready to use the castings made from them; and we recommend that the Secretary of the Association be instructed to transmit a copy of this report to the Committee of the Society of Gas Lighting, with whom this movement originated. Respectfully submitted,

IRVIN BUTTERWORTH,
C. R. FABEN, JR.,
EUGENE PRINTZ, } Committee.

On motion, the report of the committee was adopted.

AN INTRODUCTION AND A RESPONSE.

Mr. Cline—Mr. President, we are highly honored by having with us this morning a gas man of world-wide reputation, a gentleman who has but recently come among us, and I am sure that this Association would be glad to meet him and greet him. I refer to Mr. M. S. Greenough, formerly Manager of Gas Light Company, Boston, Mass., but more recently located in Cleveland, Ohio. (Applause.)

The President—I am glad of the opportunity to introduce Mr. Greenough, and, as I understand he is present, the Chair wishes him to come forward and be formally introduced.

Mr. Greenough—Mr. President and Gentlemen: I thank you very

much for this entirely unexpected courtesy. It is perfectly true that I have moved amongst you only six months ago, but I consider myself a—I can hardly say a citizen of Ohio yet, as I suppose legally I cannot vote; but I shall become such next year. I certainly had no expectation of doing more than coming down and making the acquaintance of the members of this Association in the humblest way possible by sitting in the back row and looking on. Howevever, I am very much obliged for the cordial greeting which has been extended by the Chair, in allowing me the pleasure of meeting not only the members of this Association collectively, but also for the opportunity of meeting so many of them individually before I return. I thank you and the Association for this cordial greeting. (Applause.)

At the request of Chairman Gwynn, the committee appointed last year on the subject of "Tar and the Tar Market," were granted until to-morrow to make their report.

PRESIDENT'S ADDRESS.

Mr. Welch then read to the Association the following President's address:

Gentlemen of the Association—It is gratifying to observe that you have all survived the perils and vexations of an unprecedented cold spell since last assembling; and were it not for the even temperament so proverbially a part of the gas manager of to-day, this room would more nearly resemble a madhouse than the happy surroundings of a convention hall. Nature is at times a costly teacher, and she has now furnished you a line of experience in the proper care and protection of mains and service pipes that has not been afforded in the annals of modern time; but the fact that the usual number answers to the roll call of the Secretary is proof of the quality of metal from which you are wrought, and of the fact that you have not alarmingly suffered mental or bodily depletion.

You meet as the Ninth Annual Convention of the Ohio Gas Light Association. Another year will complete a full decade of its useful offices; offices far-reaching in their benefits to every company, far beyond the border lines of the great State from which it takes its name. No share of gas stock is so obscured, so far removed from the center of activities, that it does not draw dividends from the labors of the Secretary and proceedings of this Association. It is but charitable on your part to congratulate the ones who decorate the Director's chair every six months upon their share of these earnings; yet they never read a gas journal, and forbid attendance of their employees upon these conventions, or "dock" him for the absent time. Considering the great advantages of membership in an institution of this character, and the accessibleness of the meeting place, it is amazing that, out of the 77 gas companies in the State, 17 of them have never been represented; and still more amazing is it that there are 30 which at this date are not represented. I refrain from holding up to public gaze a list of these companies, but every member may secure a list, and by personal solicitation should make each ashamed of himself or the world ashamed of it. It is not so much for the welfare of the Association that I turn the index finger of shame upon these delinquent companies; but that they may be again apprised of their annual loss. Such indifference is unbusinesslike. In good judgment, a directory should require the attendance of its managing officer.

There is another class of indifferent attendants, who undoubtedly already know a vast deal; and that is the mastodons of your profession. I assert, be their equipment what it may, they can be instructed by personal contact here and attendance annually at these meetings. Like one common system, every company is in touch with its neighbor, and what benefits one in a general way is of profit to the art at large. Furthermore, those younger in the profession, those of humbler attainments and possition, take pride in the acquaintance of and association with these men. Such opportunities stimulate their ambition, add strength and character to the meetings, more nearly meet the objects of the convention, and hence raise the standard of the gas business. It must be remembered that the babes of to-day, by the fatality of events, fill the places of giants to-morrow.

While this condition of affairs is far from gratifying to the officers of your organization, and is still farther removed from all praiseworthiness to those whose names are never heard in this convention place, still your membership has constant accretions, and now shows a list of 156 active members, besides 11 elevated to honorary membership. Twenty-five names were added last year, and, despite the ravages of the delinquency, release and death roll, this annual growth should be the proof of your work and the pride of every member. And now that, through the generous hospitality of the Columbus Gas Company, the Association has been offered a permanent, central place of meeting, there will be no geographical consideration to account for absence.

Nothing strikingly new in the appliances for the manufacture or consumption of illuminating gas has developed since your last meeting. The misfortune of such a condition of things falls chiefly upon your executive in the task that lies before him; and the grist that has gone the rounds of four Association addresses within the last 12 months is to be ground again.

An encouraging condition of marked progress has existed during the past year. Illuminating gas seems to have kept apace in its daily struggle with the electric constrictor; and the threatened raid upon gas stocks has been successfully, and, it is believed, permanently parried. A "look at them books" by the electrical directory has called a halt in the prescribed method of fighting gas companies, and prices must go up. In all likelihood you have experienced the severest form of this competition. The electric light must stand upon its merits at a living and proper return to capital.

It is admitted that "prices are too low;" that "the majority of companies are operated at a loss;" that "the incandescent light cannot compete in cost, candle for candle, with gas;" that "the current must have more money for a superior service." The success of the electrical industry in a commercial way is represented more prominently in the profits arising from the building and sale of apparatus than in that branch of it which is the furnishing of its final product to the consumer of light. Especially is this true in those fields where it has sought competition with a good quality of gas light.

The introduction of meters for the measuring of the current reveals the fact that the method heretofore practised of making minimum rates at so much per lamp has caused extravagance and waste in its use; and the consumer must now be educated to the task of using half the former amount of light or paying double the tax for a like quantity. This result has a parallel in the record of natural has methods of charging for that beneficent commodity. Again, time has now run long enough since electric lighting became an established business to give the items of "wear and tear" and "accident" a hearing; and these items must now be considered as a prominent factor in the making of a price at which the light can profitably be sold. Observation fails to discover any well founded cause for alarm over the introduction of means and appliances for the application of the current to the more essentially domestic uses; the expense which attends almost any use of it certainly becomes pronounced when used for the production of heat.

The only important channel through which electricity may be cheapened in cost of production lies in a more direct conversion of fuel; and whatever gain may be effected in this respect is largely offset by the hidden capabilities of the retort and generator in the manufacture of gas. On the side of gas stands the promising possibilities of the incandescent burner, with its high candle per foot of gas consumed; and that by the use of a gas almost destitute of expensive hydrocarbons. Such a gas is also most suitable for domestic and power uses, and thus the solution of the gas business lies in the development of a practical incandescent burner. Contemplate 19 candles per foot of gas consumed! this being the latest claim for the Welsbach burner. A step farther and you have revolulution.

This is an era of "fads," and your attention must not be so far diverted that you fail to note the progress of your humbler competitor, the coal oil lamp. Its use is not confined to the poorer classes. The means of filling and burning illuminating oils have developed very rapidly of late, until it is comparatively necessary to only "press the button." Oil is now peddled from door to door, and a circuit of oil lamps is daily visited by the oil vender to see that they are filled, trimmed and kept burning. The "Piano and "Banquet" lamps are institutions that are now a part of every well regulated household; and especially have the well-to do made a fad of it. We even find men of your own profession, producers of illuminating gas, forced by an enterprising wife and the demands of the day, maintaining the most elaborate of ornamental parlor lamps and candelabra. Oil is becoming cheaper and purer; means of consuming and handling it more convenient and attractive. This is true over the United States. It is true in England. Means should be devised, pending the advent of a practicable incandescent burner, to protect yourselves against the late form of this encroachment. An ornamental gas lamp that may be used as a portable piano or banquet lamp should be put upon the market.

It is exhilarating to state that no year in the history of gas manufacture has developed such phenomenal increase in gas consumption as the one just closed. It is a condition all over the country. This is chiefly due to the adoption of gas for domestic uses, and to a healthful and progressive condition of the gas business generally. The presence of gas

in the household for one purpose induces its adoption for a general purpose. An increase of 40 per cent. in the total output is not an uncommon report in individual cases, and an increase of 20 to 25 per cent. is the prevailing experience of companies that have given especial attention to the introduction of stoves. One large manufacturer of gas appliances advises that his sale of heating stoves in 1891 was 4,500; of gas ranges 2,000. In 1892 the sales of the former were increased to 10,000 and the latter to 5,310. The outlook for 1893 gives promise of an increase of 40 per cent. over last year. Now that gas has developed such varied and important domestic uses, it is questionable whether the public is not better served by a medium candle gas at a reduced price than by an attempt to meet the demands of a suffering public, with a highly luminous product at an enhanced cost.

I find no reason for change of opinion from that expressed in the paper,* read one year ago before this Association, upon the subject of the coal tar market. In fact, those opinions are more pronounced and the remedies suggested more imperative. The tar refiners seem destined to make the same error on their side of the market that the producers did in 1891; the latter during that period "bulling" the prices by refusing fair offers till the structure collapsed. Now the tar octopus is having its day, and it is torturing the gas companies beyond the degree of submission. This combination appears more effective, and has its highest development, right within the precincts of this Association. There is a striking similarity in the prices offered by the refiners within the market limit of Ohio production, and which do not average, net, over three cents per gallon. Tar is selling in England at prices equivalent to from one-third to one-half this sum; which is another demonstration of the fact that *actual* importation is not an important factor in our present market. Add to this showing the facts that home prices ruling at the very gateway of importation are higher than in the interior; that Eastern consumers send to Ohio for tar; and the further fact that the ante-McKinley tariff was comparatively inconsiderable; and the cry of "importation," so prominently set up by the distillers, becomes glaringly demagogical. There were imported, in 1892, according to Chief Brock, of the Bureau of Statistics, of crude tar and pitch, 104,350 barrels, a decrease from the preceding period—nine tenths of it being the product of the United Kingdom. In January of this year the quantity was 4,323 barrels. In my judgment there is enough tar produced in this country at present to supply the demand; and with the refiners well banded and a surplus of tar in England to be had almost for the asking, it will require measures of large proportion to materially advance prices. The quantity put upon the market must be contracted by some means, and I believe in Ohio taking care of herself. Concerted action is the first requisite. Tar should be burned under the retorts at all points where coke finds a ready market, at even less than double the price of tar per unit of measure for each. Storage capacities should be increased to at least two years' production. This is important. Not a barrel of tar should be put upon the general market without advice; and the delegated power to sell the entire product of the State in a single contract would give gas companies immeasurable advantage.

It will add at least 25 cents per barrel to your tar value by providing for tank cars for shipping. It may be practicable to establish a distillery at Cincinnati or Columbus (as suggested last year), operated by a joint stock company to which every gas company subscribes *pro rata*. Ten thousand dollars will establish a "still" that would work every pound of tar produced in the State. This would require a subscription by every gas company of 14 cents per barrel, on a basis of tar produced last year. Possibly this is a move too permanent for our uses and the advantages to be gained over other suggested means of relief. A serious factor in the way of any immediate and pronounced result, upon any line you may adopt, is the fact that three of the largest coal gas companies in the State have refineries at their door, and at this time are under contract for a term of years. These companies have a natural advantage of at least 75 cents per barrel above the average price at other points. The combined product of these three companies is over 50 per cent. of the total yield of the State. Control these companies and you have a powerful leverage. Those who are permanently wedded to coal gas, by reason of location or prejudice, will find the surest relief in the rapid advance of water gas. Its promoters have their least developed field in Ohio; and with her 15 per cent. ratio increased to 65 per cent.—the ratio of water gas made over the United States—the Ohio refiners will either pay the producers more, or they will pay an equivalent for long distance transportation. A committee should be appointed with full authority to organize the companies upon some general co-operative basis, but subject to direction by, and review of the Executive Committee of the Association. I know of no other industry so large as that of the producers of gas that does not have an organization for the protection of its direct interests. The tar product of Ohio companies in a raw state should yield an income of $225,000 per annum. Is the commodity worth protecting?

A review of the water gas industry reveals a continued and substantial growth. Under improved construction and operation its promoters claim a given result, by the use of a less quantity of oil and fuel, that was not attainable 12 months ago. As an adjunct for enriching purposes in a large coal gas works, water gas is indispensable; as a general purpose gas, it now supplies two thirds of the entire make of this country. It may be mentioned in this connection, as one of the notable achievements of the age, the proposed installation of a water gas station of 24,000,000 cubic feet daily capacity on Long Island, for supplying the great metropolis with this illuminating agent. This gigantic scheme is a creation of "the Ohio man, and the founder of this Assooiation. The immensity of the plant, in connection with the engineering feat of tunnelling East River, constitutes it a marvel and one scarcely achievable with coal gas.

Last year you were full of enthusiasm and hope in anticipation of an exhibit at the Columbian Exposition. You were happily contemplating an adjournment from this meeting to the apartment of Gas Exhibit, Chicago. Who will now voluntarily show himself there with the badge of his profession upon his breast? Twenty-one of the Ohio Companies responded to the subscription call! No band of Trojans fought more zealously than did the Gas Industry Council; and especially its representative who met you here last March. The measure of loss is incalculable. Time cannot compensate the gas industry. The result passes into history as a disgrace to the art and to the nation. It is to be hoped, indeed, that your fortune may be somewhat retrieved by the efforts of Miss Corson at the World's Fair, in a most important branch of your industry.

The diversity of uses to which gas can be put has become so wide and the demand for it so large that the "dollar gas" rate is no longer an experiment, but it finds frequent expression in all directions. However, the inalienable right of the American citizen to "kick" more vigorously asserts itself, and as the rate touches bottom, the cry for "better gas," "higher candle power," is raised by the people. Concession and fair treatment by a gas company create suspicion in the public. The latter are becoming more sensitive upon the subject of "gas monopoly," and the tendency to legislative interference, municipal control and ownership, and to raiding schemes, illustrates the great desire and "hobby" of mankind to get something for nothing. The storm center of such self-inflicted discontent among the people, born of ignorance and prejudice, bursts forth—now at Cleveland, then at Des Moines, later at Springfield; and so on with periodical certainty. The "greased wind" parasite and the professional blackmailer are usually the instigators of these "natural" uprisings, who seek to filch money, either from the municipality by the sale of worthless apparatus, or from the established company as a "bonus" for "yielding unto Cæsar that which is already Cæsar's."

I wish to call your attention to the gas exhibit. This feature of your annual gatherings is of value. Every member should take time to examine and digest it thoroughly.

The exhibit men justly complain of the non-attendance and apathy shown. It is not a one-sided enterprise. It is in the field of day consumption that the energies of the gas manager can be most profitably exerted. Do not underestimate the opportunity offered you.

Three names have been stricken from the roll by the unsparing hand of death: Mr. George Shepard Page, Mr. John J. Griffin and Mr. Horace S. Walbridge, each an eminent man in his profession and a high honor to the Association. You will direct the appointing of committees for the offering of suitable resolutions to be sent the families of the deceased and to be spread upon your record book, in lasting testimony of your esteem and attachment.

You find before you, by grace of the ingenuity and extreme good nature of the capable Secretary of this Association, a list of papers, rich in topic, and by authors who are practical men among you, dealing with questions of paramount importance to every one. It is the discussions these papers arouse that yield the greatest good. Enter into it with promptness and vigor.

I hope throughout the meeting to show my appreciation of the honor and privilege it is to preside over your deliberations; and in conclusion thank you, and announce that the further pleasure of the Association is now in order. (Applause.)

Special Committees.

On motion, the Secretary appointed the following Committee upon

* See JOURNAL, Vol. LVI., April 11, 1892, page 539.

the President's Address: Eugene Printz, O. N. Guldlin and H. W. Douglas.

On motion of Mr. Penn, the President appointed the following committee to draft suitable memorials in respect to deceased members: C. R. Faben, Jr., William McDonald and S. F. Hayward.

Mr. S. F. Hayward, of New York, then read to the Association the following paper on

THE PRESENT STATE OF THE ART OF PURIFICATION IN CLOSED VESSELS.

If crude gas could be purified by continuous action, such as was outlined a few years ago when the Claus Process was brought to the attention of the gas world—removing the ammonia by scrubbers, the ammonia removing the sulphureted hydrogen, and the sulphur the bisulphide of carbon and cyanides, and these all recovered, as marketable products, in continuous action—it would be a great advance in the grand work of the light giver. Or, even if the long desired process *in situ* could be accomplished, of admitting to the boxes material which would absorb or unite with the impurities, and these same impurities with others, until 50 or 60 per cent. of the compounds of sulphur had been accumulated, and this with no great risk, complications or skilled labor, many would hail it as a great advance.

There are well known reasons, good ones, why this is desired.

First, economy of labor; of gas; of material; of enricher; of space.

Of labor, because the changing of boxes is done away with.

Of gas, because the removal of covers causes the loss of a quantity of gas each time.

Of material, because the efficiency of it is increased by this process over the revivification by removal.

Of enrichers, because each time the lid is replaced a large quantity of air is introduced, which reduces the candle power.

Of space, because greater effect is realized.

Second, immunity from nuisance; in revivifying oxide in open air; in removing noxious spent lime.

It would be impossible to give even a meager description of the various plans which have been brought out during the past 15 years for purifying crude gas in closed vessels, through the medium of a paper which would hold your attention or patience.

The "Claus Process," brought out and patented in England, for reasons best known to the owners, has made little or no progress. We, however, apprehend that the apparatus is too expensive and the royalty too high for adoption by enough companies to even determine its worth or success. While it has received consideration in our own country, we do not know of its having been adopted by a single gas company.

The process of partial revivification of iron oxide in boxes, without removing the lids, by the introduction of a certain percentage of air, has received considerable attention and thought. A number of companies have adopted it successfully; but no two engineers, however, agree as to this certain percentage of air, the variation in practice ranging from 1 to 3 per cent. The greatest difficulty seems to be in the hardening or solidifying of the material in the boxes, thus causing back pressure, and making it necessary to be removed and broken up.

The useful part of the air thus drawn in is the oxygen; and this, unfortunately, is only one fifth of the whole, four-fifths being nitrogen. How much of a detriment this is to the illuminating power of gas, engineers do not agree upon. Careful experiments are now being made in England, we understand, to determine this point, both in the use of air and the introduction of nitrogen with purified gas. A concise and clear account comes to me, from Mr. Thompson, of St. Louis, of their practice at the Laclede works:

"In reference to our method of revivifying oxide of iron without removal from purifying boxes, would say, our only practice in this direction at the present time has been that which you have indicated, namely, the admission of a small percentage of air at the exhauster inlet. The air is drawn in through a wet meter, hourly readings of which are taken. The proportion averages 1¼ per cent. of the entire make. This is not sufficient for the proper accomplishment of the design; we would admit 2 per cent. of the air, if the meter were of proper size. The effect of this admission on the illuminating power of the gas is but slight. The oxygen is wholly abstracted by the iron, and there only remains the 1 per cent. of nitrogen, which may be described as a passive diluent; and inasmuch as the gas requires some additional carbureting, to atone for the presence of carbonic acid when lime is dispensed with, the oil needed to deal with this added hundredth part of nitrogen and maintain the standard candle power is practically imperceptible."

The next process or practice in this line might be termed the air and steam introduction. This is very fully given in a paper by Mr. F. G. Dexter, before the Incorporated Gas Institute, of England.

He sets forth, and very ably, too, that moisture plays a very important figure in chemical reactions. That by the drawing in of air to revivify in the boxes heat is created, the material becomes dry, hardens, cakes and produces back pressure. To remedy this he introduces exhaust steam from the exhauster engine, thoroughly mixing it with the gas by means of a scrubber having trays and filled with shavings.

The average results obtained are as follows:

First—During the summer months, with 2 per cent. of air and no steam, the gas purified per box averaged 3,000,000 cubic feet.

Second—Under similar conditions of make in summer, with 2 per cent. of air and steam, the average quantity purified per box was 7,000,000 cubic feet.

Third—During the winter months, with 0.8 per cent. of air only and no steam, the average life per box was 2,400,000 cubic feet.

Fourth—With steam added and 0.8 per cent. of air (under conditions otherwise the same), the life per box rose to 7,200,000 cubic feet.

"I may mention that the oxide used in these trials contained from 36 to 40 per cent. of sulphur; and the gas, on entering the purifiers while under steam, was at a temperature of 90° to 100° F. The efficiency of the oxide in each box was raised, by the help of steam, from twice to three times its normal value—the greatest increase of efficiency being obtained in winter, when ordinarily, by reason of increased flow and low temperatures, the efficiency is generally lowest."

The specific points and advantages arising from the addition of moisture in this way may be briefly enumerated as follows:

First—The steam supplies the necessary moisture to preserve the activity of the oxide.

Second—The oxygen of the air supply seems to possess far more active properties under the influence of moisture. At any rate, a comparison of statements *First* and *Second*, or *Third* and *Fourth*, singularly confirms this.

Third—Back pressure from hardening or caking is absolutely stopped. This I attribute to the prevention of the drying up effect, and also to the undoubted fact that the sawdust or woody fiber in oxide swells considerably, thus tending strongly to disintegrate the mass, rather than allow it to bind.

Fourth—The high temperature of the ingoing gas, particularly in a humid condition, is distinctly favorable to the oxidation, and to the chemical reactions generally.

Fifth—The addition of heat in this way is of great importance in winter, counteracting most satisfactorily the inert action of the oxide under severe cold, prolonging the life of the box, and enabling far greater dependence to be placed on the purifying operations.

The last process or operation which I will call in review, is what is known as the oxygen or Brin's process. For the past few years this has been the subject of more papers, discussions and interest than any of the other schemes. When, in 1889, Mr. Valon, of Ramsgate, England, read his paper before the Gas Institute, giving his experience as well as theories, the gas world was somewhat startled by the boldness of some of the propositions laid down and the great advantages claimed by its use.

Here are some of the claims: That the action of oxygen was instantaneous; that the sulphur in the lime remained fixed; that with oxygen a greatly reduced area is required; that there is a saving in purifying material; that there is economy in labor; simultaneous and perfect purification from carbonic acid, sulphureted hydrogen and sulphur in all forms. Complete immunity from anything objectionable while carrying on the operation. That no enricher is required; no carbonic acid; no nitrogen; candle power, 16.5 to 17.3. Let me quote from his paper:

"It may, therefore, be safely asserted that great economy will result from the use of oxygen in purification by its application to oxide of iron. The absence of the necessity for the frequent opening of the boxes (excepting where one may get hardened, and which can be loosened *in situ*); the avoidance of a shift of material from month's end to month's end, until the material is fully spent and charged with 20 to 30 per cent. more sulphur than can possibly be put into it in any other way; the increase in illuminating power, which is undoubted as between air and a proper proportion of oxygen; and the immense saving in space from its intense and certain action—all these must leave a very large balance in its favor, even in oxide of iron purification only.

"The economies of oxygen purification have been designedly understated, the saving claimed having been greatly exceeded at Ramsgate. It is sufficient for the author's purpose to make it clear that the system is self-supporting under all conditions where gas must be purified, and

leaving such a margin as to recommend its adoption by all gas companies and corporations."

Mr. Valon estimates the cost of oxygen, 90 per cent. pure, in a works making 120,000,000 feet of gas per year, 37 to 63 cents per 1,000 feet, and .05 to .06 per cent. the amount to use in each 1,000 feet of gas made. It would be well to state here that a close estimate, which includes interest on the capital employed to erect oxygen plant, royalties and depreciation, puts the expenditure at 85 cents to $1.05 per 1,000.

In view of all these facts, why has not the process been more generally adopted? True, a few of the English companies have taken it up, but aside from Montreal (whom we understand have put in a plant), we do not know of a single company on this side of the Atlantic using it. At the Montreal oxygen plant I may note that a disastrous explosion happened some weeks ago, that resulted in one death and much damage to the property. Of course, only large companies would think of using this form of purification, "as the game would hardly pay for the candle."

Let us glance for a moment at what will have to be provided for: Oxygen generating plant, which would include furnaces, retorts, 20 horse power engine, and air pumps capable of dealing with 25,000 to 30,000 feet of air a day; holder; automatic regulating device for the introduction of oxygen in proportion to make of gas; device for preventing flow of gas to oxygen holder, in case of stoppage or increase of back pressure (as a very dangerous explosive would thus be formed); safety valves, piping, etc.

Looking at it from all sides, it would seem, with the rapid strides being made by water gas in this country, that the air process is preferable. One-fifth of a gallon of oil, estimated at three-quarters of a cent, will restore the illuminating power. It may not work in line, but it does in oxide or iron sponge purification, and to this, in conjunction with revivified ammonia liquors, or liming of the the coal, we look for the solution of the problem of "purification in closed vessels."

Discussion.

The President—Gentlemen, this is a subject that opens up quite a field for profitable discussion as well as experiment and investigation. There are members here who can talk almost as intelligently upon the subject as Mr. Hayward, and we should be very glad to hear from any of them.

Mr. Douglas—It seems to me the comparison, on the third page, between the winter and summer months, is hardly fair. The results in the summer with air and steam are given as very much larger than in winter, when there is no steam. It seems to me that a good deal of that is due to the difference in the velocity of the gas in winter and summer. On page two he speaks of more enrichers being needed where the air is introduced in changing purifiers. Wouldn't the proportion of air admitted, when it is admitted constantly, with the gas, be greater than the amount introduced when the purifiers are changed and air is thus introduced into the boxes?

Mr. Faben—I have listened to the paper very attentively, and have been much interested in the subject. I can only add that my experience as to the introduction of air during the process of manufacture has been in keeping with the remarks of the gentleman who read the paper. I originally put the air in at the point spoken of by Mr. Thompson—at the exhauster; but I did not find the beneficial results from it that I had reason to anticipate. One other fact which manifested itself was that by introducing the air at that point I did not get as high a strength of ammoniacal liquor in the scrubber without the ammonia passing over. This led me to adopt the practice of introducing the air after the scrubber and into the inlet of the center seal by the aid of a steam jet, and I find I secure the benefit of that moisture, as described in the paper.

Mr. Nash—I would like to ask Mr. Faben if he used a meter to determine what per cent. of air he put in?

Mr. Faben—I did. For a considerable time I used an ordinary dry meter, and put in about 2 per cent. of air. I have not a meter at the present time.

Mr. Phillips—During my first year with the works where I am now located we had some trouble with our purifying apparatus, but I have made a porch alongside of the purifying house, in which we place the oxide, and have run a series of steam pipes under the floor. That is, I have run a steam pipe and then two bricks, then another steam pipe, etc., making a steam coil, as it were, to revivify our purifying material. I have never tried the air process, but the arrangement I speak of works splendidly; we have no trouble. On the other side of this porch are a lot of windows, so that we can get plenty of air, and in three days we revivify a box, getting it back to almost its original color. For the past few months we have only been making about half of our gas from coal—the other half is water and oil gas—consequently I could not speak advisedly on purification.

Mr. Greenough—I have had no experience except in regard to the introduction of air into the purifying apparatus. I have been in the habit, for some time past, of revivifying the material without taking it out of the boxes, by inducing a suction with the aid of a steam jet, taking the air down through the material and out through the outlet pipe of the center seal, which we found to be a very great economy in labor, enabling us sometimes to go for a month or more at a time without taking any material out of the boxes. In fact, I have known it to go for three months, which reduces the economy of labor so low that it has not been necessary for us to go very much further in that direction. I presume the question of the introduction of air is one which is very much more important to companies whose purifying boxes are too small than to those which are amply provided. This is a matter I have looked upon with considerable interest, and which will have to be considered in Cleveland if the business increases as rapidly as we hope it will.

Mr. Shelton—I think there is one mistake in the last paragraph, at least it seems so to me. It spoils the value of the paper if it is not a mistake. Mr. Hayward first describes the air process, then describes the air and steam process, then describes the oxygen process. The air and steam would appear to be much better than air alone, yet in summing up, after indicating that the oxygen process is too expensive, except in large works, at about the seventh line from the conclusion of the paper he says: "Looking at it from all sides, it would seem, with the rapid strides being made by water gas in this country, that the air process is preferable." Does he not mean "the air *and steam* process is preferable?"

Mr. Hayward—That is what I refer to, certainly.

Mr. Shelton—I supposed you did, as in the first part of your paper you call attention to the air process, and secondly, to another process, using the term "air and steam," and it seems to me that the line referred to should be corrected to read "air and steam process is preferable," instead of "air process is preferable."

Mr. Hayward—I am obliged to you, Mr. Shelton, for calling attention to the unintentional slip.

Mr. Miller—I am considerably interested in the introduction of steam into the gas. I have noted that in this reaction in the boxes water would be thrown down continuously, and sufficiently to keep the oxide saturated. I have always found that the gas was continuously reduced in temperature from the outlet of the retorts, or of the water gas plant, as the case might be, to the outlet of the boxes; and in such cases I have always had the gas saturated, or rather the oxide saturated, with moisture; and I don't think, in that case, the steam would help any, because, certainly, in the reaction in the boxes water is thrown down, and unless there is a very rapid rise in the temperature in the gas to take off that water, the oxide could not become dry. It is only by rapid rise in the temperature that it would dry. I would like to know whether it would be any help to put steam in the gas when the oxide is already saturated.

Mr. Faben—I should say in that connection, if air is introduced alone there is a continuous drying process going on, and the moisture is carried away. I don't think the gas is saturated to the dew point, but the moisture certainly disappears, and when the air is introduced without steam there is a revivification going on in the boxes, and heat is generating. The dew point is raised, and the point of saturation is not in the incoming gas, for the moisture is taken up and carried off; but when the steam is introduced, the drying up, hardening or caking that takes place when air is used alone does not occur when steam is introduced with it. In our practice the back pressure from the boxes (if we do have it, and we sometimes do, though not commonly), arises from the caking of the lime. The lime becomes like plaster. We put it in very wet, and it is strong lime. To reduce that hardening process, and to maintain the moisture in the boxes, we add coke breeze for the purpose of aiding the moisture; for the moisture present in the lime, to account for the water that would be thrown off on the absorption of the carbonic acid by the lime, reduces it to lime carbonate, and when this breeze is added and the spaces are charged with moisture and water, and introduce steam in connection with the air and pass it directly into the boxes, that, added to the moisture that was already in the breeze, prevents all stoppages from back pressure.

Mr. Miller—I don't think Mr. Faben quite caught my point. It was not only that the gas was saturated as it approached the boxes, but in the reaction between the oxide of iron and the sulphureted hydrogen water will be chemically formed; and when you oxidize the sulphide of iron that is formed, and reduce it to oxide of iron, water will again be formed. Now, that water has to be disposed of in some way, and it is

only by the raising of the temperature of the gas that the water will be carried off, provided the gas is anywhere near saturated with water vapor when it enters the boxes. Now, if that gas does not rise in temperature the water will not be carried off, and the boxes will not become dry and caked. My experience has been that in keeping the purifying apparatus cool and letting the gas go into the purifying house at a temperature somewhat above the temperature of the purifying house, the oxide cannot cake. It will keep moist and work very satisfactorily, and I have found that to be true during several years' experience.

Mr. Hayward—I think Mr. Dexter states in the extract I have quoted at what temperature the gas enters the boxes, which is from 90° to 100°. That is ample, is it not, summer and winter?

Mr. Faben—I think that temperature is higher than we ordinarily carry in this country; and I imagine there was a time in Mr. Dexter's process when the temperature was lower than 90°, but the temperature was raised by the introduction of exhaust steam.

Mr. Hayward—That is just the point he claims, Mr. Faben—that the introduction of steam does raise the temperature of the gas sufficiently to preserve active chemical reaction.

Mr. Faben—I think Mr. Miller's suggestion explains itself. If you introduce gas in the boxes at a higher temperature than at which it leaves them, the process of condensation goes on in the boxes, and the water formed is retained there.

Mr. Bates—For a period of years I adopted about the process mentioned, but I hardly think the results would be fair, comparatively, as we were making perhaps two fifths water gas. I will state, though, that I introduced the air, pure and simple, at the exhauster, through a meter, at the rate of 1¼ per cent., and I found that the life of the boxes, containing 100 bushels of oxide, was at the rate of from three to four millions per box. I never introduced steam, however.

The President—I think that Questions 4 and 9, of the Question Box, pertain to this topic, and we can discuss and answer them at this time.

Question 4.—"Has anyone had any trouble in purifying water gas with iron sponge; and if so, how was it remedied?"

Mr. Faben—I personally have never had any trouble in purifying water gas with iron sponge.

Mr. Miller—I have purified water gas with iron sponge a great deal, and I must say it works very much better than with coal gas, for this reason: In the water gas process no combination of sulphur and carbon is found—the only sulphur found comes from the sulphureted hydrogen; and, inasmuch as the oxides of iron will take that out thoroughly, you don't need any catch box or lime box, of any kind, to take out the combinations of sulphur and carbon. For that reason it works better with water gas than coal gas. There is no trouble with it.

Mr. Faben—I think one point that Mr. Miller don't quite answer in that connection is this: The experience of water gas makers in using fresh oxide of iron is that there may be stoppages in the burners.

Mr. Miller—Yes; that is a point that didn't occur to me. The carbonic oxide and the iron of fresh oxide apparently form a carbonate of iron that will carry along with the gas. I do not know whether it is confined to water gas or not, not having had experience with coal gas and oxide. But there is no question that it will do it with water gas. It will form this compound, going along with the gas, condensing at the top, or deposit apparently free from iron, and cause burner stoppages. But that can very easily be remedied by putting the fresh oxide under a layer of old oxide, or by cutting off both boxes, two boxes at a time, and putting in a box of lime or old oxide in the series after a box of new oxide. I have had quite a little experience in this line, and I have found that it could be very easily remedied in that way. It will never do to put a lot of fresh oxide all at once into the boxes, or even fill one box with it; but it can be worked in very satisfactorily as I have suggested, and after being used once or twice there is no trouble with it. I have often seen in a station meter the iron in the water apparently dissolved when new oxide is used, but after the oxide has been used once, no more trouble of that kind will be experienced.

The President—That, I should think, is a very important fact, and seems to dispose of the subject.

Question 9.—"What is the best treatment of oxide of iron after it has taken up 35 or 40 per cent. of sulphur?"

Mr. Hayward—I don't think I can answer that question any better than it seems to be answered in Mr. Dexter's paper that I quote here regarding that very point: "I may mention that the oxide used in these trials contained from 36 to 40 per cent. of sulphur, and the gas on entering the purifiers with the steam was at a temperature of 90° to 100° F." You see the oxide which he has used and with which he got such excellent results, by using air and steam, was oxide that contained this very proportion of sulphur that is spoken of here in this question. Ordinarily, I believe, in practice a gas maker don't, in this country, attempt to get more than 50 per cent. of sulphur in the oxide. When it reaches that point the changes have to be made so frequently that the labor account enters into consideration and renders it impracticable. Is that not so, Mr. Douglas?

Mr. Douglas—I think 50 per cent. is about the limit. I may say in this connection that I know of one case where the sulphur has been successfully taken out of the oxide—I think I have mentioned it before, perhaps, and some of the members present may have heard me speak of it—where the oxide was thrown on a bed of coke out in the yard and the sulphur burned out completely, so much so that the same oxide has been used since 1885, and is still in use, and they say they have more now than in the beginning. (Laughter.)

A vote of thanks was tendered Mr. Hayward for his paper.

First Day—Afternoon Session.

The Secretary announced that on the following day, at 1 o'clock, there would be carriages in waiting at the Hotel Chittenden for all members who might desire to make a visit to the works of the Ohio Pipe Company.

Mr. Jerome Penn, of Washington C. H., Ohio, then read the following paper:

A TEST OF THE BACKUS HEATER.

Last winter, while on a trip seeking the best process for making a good, low priced gas, a gentleman with whom I was having some dealings requested me to visit his house and see a new gas heater which he was using. Of course, the kind invitation was gladly accepted, as I am always anxious to see or learn anything that has a tendency to increase my output of gas, especially in the fuel line, as there is surely a great future for gas manufacturers in this direction. My first impression on entering the room (after being told there was no flue connection) was that it would never do, as the products of combustion must be taken away. The thought also came, "The heat is not sufficient."

Skeptical of its being a practical success, I, however, thought it would be very nice to use in mild weather or in places where the heating apparatus was not sufficient to give the required heat. Shortly after that I wrote the patentee for information, prices, etc.

On account of pressing business I did not give any more attention to the matter until early autumn, when one of our citizens, on his return from having spent several days visiting relatives in Pennsylvania, noticed one of the heaters in our show window.

He called, made some inquiry about it, and told me of some parties in Pennsylvania who were using them, and of their excellent qualities. As I was building a new house and had not yet put in any heating apparatus, I concluded to go to the manufacturer and see what there was in it.

After visiting the factory and conversing with people that had been using them, I concluded to put them in my house. Seven of different sizes and styles were put in. During the month of December nothing but gas was used; the house contains 23,000 cubic feet of space. All the living rooms were kept at 72° F., others at about 66°.

During this month a pretty fair test was made in dining room, which, being 13½ feet by 22, contains 2,970 cubic feet.

I had a five-light meter, with nothing else using off it but the heater. The heater was used every day and night except one night. The consumption of gas for the month was 2,500 feet.

The temperature during the month ranged from 2° below to 60° above. None of the inside doors of house, except in the guests' chamber, are closed, always remaining open day and night, so that the heat from the night consumption of gas in the dining room escaped through open doors into other rooms where heat during the night was turned off. This dining room has no outside doors, is situated in the northeastern portion of the building, and has two large windows on the eastern exposure.

On March 5th, a special test as to the atmosphere was made. Weather was clear and cold, thermometer registered 18° above. Closed all inside doors of room in which test was made, and opened the windows, cooling the atmosphere of the room. Hygrometer stood at 40.

Had two thermometers, one in center of room hanging on chandelier 5 feet 10 inches from floor, the other near a window 5 feet from floor. Closed windows and started fire in heater at 8 o'clock A. M. Estimated consumption, 15 feet per hour.

Thermometer in center of room stood at 44°, the one at side near window at 34°; at 8.05 both thermometers stood at 56°; at 8.09 both thermometers stood at 60°; at 8.20 both thermometers stood at 66°, hygro-

meter stood at 45° ; at 8.35 center thermometer was at 68°, side thermometer at 70°, hygrometer nearly normal ; at 8.40 center thermometer stood at 70°, side thermometer at 72°, hygrometer normal.

Turned gas down in heater to about 5 feet, and let it run for over an hour ; the temperature rose to 78°, the hygrometer still stood normal. As soon as the doors or windows were opened the hygrometer indicated the atmosphere to be dry. The hygrometer used in this test was tested with others in Philadelphia last month and found to be correct.

You will observe from the above test that the heat is well distributed, as the thermometer showed it to be warmer near the window than it was in the center of the room directly in front of fire.

No pretensions are made by me toward being a scientist, and the above test is practical rather than scientific ; it was made in my own room, for my personal benefit.

While there are many good points claimed for the heater by its manufacturers, these are a few facts that I have ascertained from a daily use of the Backus heater.

Discussion.

Mr. Donald McDonald—I would like to ask Mr. Penn if he has any reason to think that an ordinary gas stove burning in a room, with no escape for products of combustion, would not heat the room just as well as a Backus heater ? As I understand the Backus heater, it has a water log prepared for the purpose of filling the room with vapor. My experience with gas stoves is not that they make the atmosphere too dry, but that they make the atmosphere too wet. The windows are always covered with ice and moisture. Nor can I see why the addition of this steam heating surface would increase the heating power of the heater over an ordinary gas stove. It seems to me the putting of additional moisture into the room would be a positive detriment.

Mr. Penn—In regard to whether another stove would not heat the room just as well, there is no doubt that any other stove would do it, yet I do not know it would do it with the same amount of gas. I do not think it will. Of course, the object or purpose to be secured in the use of a gas stove is perfect combustion. As a general thing, other stoves do not have that perfect combustion, or as good combustion, as is to be found in the Backus heater. In the ordinary gas stoves, or at least in those that I have tested (and I have tried a number of them), you will have a very unpleasant odor in the room, in spite of you. At least I have not found anything that will do away with that odor which arises from the burnt gas. In regard to the moisture, of course there is quite a question there ; there is something about it I cannot explain —something I would like to have explained to me—whether the moisture that comes from the burning of the gas is the moisture that makes the formation on the windows. Of course you can have have other kinds of fire in a room, and the moisture will still collect on the windows. You understand that it is the difference between the atmosphere outside and the atmosphere inside which causes the condensation on the windows ; but why it would not be just as bad in a great many other heaters I am unable to explain.

Mr. Donald McDonald—The burning of 1 pound of natural gas makes 2 pounds of water. That being the case, it seems to me folly to be putting a vapor pan there to charge that air with more water. I noticed, in reading the circular of the gentleman manufacturing the Backus heater, he prides himself a great deal on keeping the atmosphere wet, while I have been spending my time trying to get it dry. Of course, if you burn fires with a flue the moisture is carried up the chimney ; but it seems to me that one of the objectionable features that could be urged against the Backus heater is that it makes the atmosphere so wet.

Mr. Penn—The Backus heater undoubtedly keeps the atmosphere of the room in a normal condition, if there is any dependence to be placed in this hygrometer. By the use of the Backus heater you can keep it normal, neither wet nor dry. It don't go either below or above the normal point. I think the test I made of it with the hygrometer shows that the atmosphere has all the moisture in it that it will carry at that temperature.

A Member—What do we understand by the normal condition of the atmosphere ?

Mr. Penn—As I understand it, it is the proper condition to be healthful. I think the hygrometer registers from zero to 100°. Fifty degrees is normal, below 50° is dry, and above it is moist. If you have it above 50° you have it too moist to be healthy, as I understand it.

Mr. Miller—I would like to ask Mr. Penn whether the flame comes in contact with any surface ?

Mr. Penn—Yes ; it comes in contact with the log covered with asbestos.

Mr. Miller—Then in that case it is absolutely impossible for combustion to be perfect. It is not perfect with the bunsen burner, or with any other burner where the flame comes in contact with any cold surface. I think if Mr. Penn had used a heater having an illuminating flame, the combustion would have been far more perfect, and, therefore, the temperature would have been higher than in a heater where the flame comes in contact with a cold surface.

Mr. Penn—The flame, of course, comes in contact with the asbestos only, which tends to make the fire look nice in burning and present a pleasant appearance.

Mr. Miller—That is all very pretty, and I don't contradict the fact that it adds to the appearance ; but it certainly must keep combustion from being complete and perfect. I think if he had caught some of the escaping gas and analyzed it, he would have found carbonic oxide in it.

Mr. Penn—Of course I have no interest in the Backus heater any more than any other gas man has, but I think we all have an interest in this matter, because we want something that will use our gas, and use lots of it. We have always been advocating the use of gas stoves for cooking and heating. In regard to what Mr. Miller says, I will state that Prof. Tilden, of New York, who is a man of reputation and entitled to be quoted as authority, has analyzed the air, and he says it is the best he ever tested where gas stoves have been used for heating purposes ; the air is in better condition. I cannot remember the exact words or figures he used, but that is the result of his analysis.

Mr. Donald McDonald—In a circular published by the Backus heater people it is stated that 15 feet of gas will take 230 feet of air, and that that air is totally destroyed and fresh air comes in to take its place. Now the way I learned natural philosophy was that one-fifth was utilized in the shape of oxygen and the balance remained in the shape of nitrogen. My own experience in heating rooms with gas where there is no flue connection is that the presence of carbonic acid is not perceptible, or not disagreeable, but the presence of steam is a worse difficulty; and, next to that, and more serious, is the fact that the oxygen is burned out of the air, leaving the nitrogen. The point I don't understand is how a room can be heated for 24 hours at a time with a stove burning 10 or 15 feet of gas per hour, destroying the oxygen in the air all the time and leaving the nitrogen ; and yet I know by actual experience in my own house, and the houses of a great many of my friends, that a room can be heated in that way and kept perfectly pleasant. It seems to me that unless there is some means by which the nitrogen gets out doors and the oxygen comes in, that the atmosphere inside will become so charged with nitrogen that it will not support life. I was in hopes that this paper would provoke some discussion on that subject. It is a subject in which we are all interested, and I would like to hear from the Association upon it.

Mr. Miller—With regard to that point, I think it is generally claimed that in a brick house, having a 12 inch wall, and kept tightly closed, the air will be changed once every hour.

Mr. Penn—In my house I used it day and night. I slept in the room where the fire was burning all the time, together with my family, and we felt no inconvenience whatever. I noticed that upon going out of my house, heated as I have described, into the air, I didn't feel the difference or notice the sudden change from the warm atmosphere to the cold atmosphere like I did in coming from a room heated by hot air or steam, or some other heating apparatus ; and I concluded that the heat from these heaters is more pleasant and does not cause one to experience a sudden change in conditions. Being one evening in a house heated by hot air, when I stepped out doors the air seemed to go all through me—chilled me—whereas, I didn't experience the same feeling when I went from my house, heated in this way, into the open air. I do not know much about the philosophy of it, but undoubtedly there are some very good points about these heaters. I am not chemist enough to analyze the air, and although I tried very hard to get parties in our town to make an analysis, we have nobody there smart enough to do it !

The Secretary—I would like to ask Mr. Penn whether he means to state in his paper that he heated his whole house, upstairs and down, for the month of December, with 2,500 feet of gas ; and I would also like to ask him whether there was not a large deposit of moisture which froze on the windows during the month ?

Mr. Penn—I could hardly heat the whole house for one month with 2,500 feet of gas. In using that figure I referred only to the dining room. Of course we didn't heat the dining room as warm as it is in this room now; as warm as you would want it to be pleasant to sit in.

The Secretary—You say that you used nothing but gas during the month of December ?

Mr. Penn—Yes, sir. I had one meter set for gas used in the dining room alone, separate from any other, in order to make the one test. Of course I had heaters for the other parts of the house. Of course there

is a deposit of moisture on the windows, and we thought possibly some of it was on account of the house being new, we having moved into it in November, but I freely confess I believe it is in the heater, to a great extent at least. There don't seem to be any ill effects coming from it, except it is very unpleasant to have it on the windows, especially when it is freezing, then melting and running down on the carpets. I have nothing to conceal in regard to this matter, yet I am not going to tell you any more than I have to.

Mr. Roper—Is there any flue to this heater?

Mr. Penn—There is no flue connection to the heater.

Mr. Roper—As I understand the construction of the Backus heater, the back of it is cast iron and hollow. Now I would like to ask, does the flue draw down and go up and down, or just simply go up over the log?

Mr. Penn—There is no flue at all.

Mr. Roper—Nothing could carry it into the water underneath?

Mr. Penn—No, sir. There is a log, shaped something like that (indicating); the burners are located at this point, and this log goes down into the trough of water.

Mr. Roper—What I am getting at is whether there is anything to draw the products of combustion down into this pan of water that is under the logs.

Mr. Penn—There is circulation of air in the room. By testing it you can see there is a current of air in the room going into the fire.

Mr. Roper—I don't want to hack Mr. Penn any more than I have to, of course, on the subject of the Backus heater, but my brother, who has one in his own house was very enthusiastic over it last winter, but this winter he could not do anything with. He had two rooms heated by a Backus heater, and got worked up to the point where he was going to have Backus heaters all over the house, and this year he was not going to run his furnace at all, and he didn't lay in any coal or make any preparation to run his furnaces until he had to. But this winter he soon found he had to heat the house with his furnace and could not depend on the heater. Of course, there is a difference between this year and last year, one being a great deal colder than the other.

Mr. Printz—I would like to ask Mr. Penn the amount of gas that was used during the month of December for his whole house. He states that he used 2,500 feet in heating one room. It strikes me that it don't make any difference what kind of a heater it was if it used over a certain amount of gas. Our object is to get hold of a heater that will do its work cheaply, and if the Backus heater does not do it cheaply, that, of course, would not answer our purpose. He does not say anything at all about the amount of gas used for heating the whole house during the month of December.

Mr. Penn—One of the great objections I had to writing this paper was coming up here to be cross-examined. I have been listening for that question, and I thought somebody would stick it at me. I really haven't had a fair chance to make tests on this subject, except as to the test I have given you. Those tests are as nearly correct as I could possibly make them. I hope that none of my Directors will find out this statement, but since the question has been asked I will answer it. I ought to explain a little further. In piping my house I piped it for fuel gas as well as illuminating gas. I expected at some time to heat with gas, and I had a fuel line and an illuminating line. The fuel line, of course, connected through the fireplaces. In addition to that I have a hot water heater in the cellar which furnishes hot water for the different parts of the house, and I also use gas in the cooking stove, and you know it takes a good deal of gas to cook—especially so with a new cook who has not been used to using it. I think there is a great deal of waste. But I will admit that I was astonished when the meter man read my meter. I thought that the meter—well, you have heard that story told before. (Laughter.) But, anyhow, it run up to 50,000 feet. (Great laughter.)

Mr. D. McDonald—Mr. Penn, I wouldn't blame all that on the cook.

A Member—Natural gas is supposed to be a pretty strong gas, but we find in our city the man who gets off with 60,000 feet in a month like January last is very lucky.

Mr. Penn—There is another thing. In the reception hall I could not get a heater that would fit the fireplace, so that there was room for lots of heated air to escape. And another thing, the house was heated up all over—much of the time it was entirely too warm, the thermometer running up to 80°. A person sitting in the room without noticing particularly, would not realize that the heat was increasing until the temperature would reach 80°. If the temperature had been watched more closely I am satisfied that the amount of gas we would have been able to save would have been considerable. Now, of course you may say that you don't understand why I used 2,500 feet in the dining room, which is the largest room in the house, and with the doors open, and yet used 50,000 feet in heating the balance of the house. I cannot explain that either; I thought there was a mistake in the meter. But I believe the meter is correct and the reading was all right. Certainly, for that room, if the meter registered the amount consumed correctly, it was a very reasonable rate of gas consumed.

Mr. Shelton—I think there is something very radically wrong with that meter in Mr. Penn's house. He says he has seven of those Backus heaters in his house, and, according to his paper, the one in the dining room consumed 2,500 feet of gas. If the six others had consumed the same quantity that would be about 15,000 feet more, and the 2,500 would make about 17,500, and yet he says there were 50,000 feet consumed, and the question to my mind is, where did the rest go?

Mr. Penn—Just as I say, this hot water arrangement was going day and night, continuously.

A Member—Mr. Shelton does not take the cook into consideration.

Mr. Starr—Another statement in this paper is rather surprising to me, and that is that in the center of the room where the heater was, the thermometer should be 2° lower than over by the window where it is generally the coldest. I would like to inquire what kind of a day it was? If the window were on the south side of the house, and it was a sunshiny day, that might account for it; but if it were a cloudy day, and the window was on the north side, I would like to know how that would come about. I would like to ask if the room didn't feel warmer to you than you would suppose it to be by looking at the thermometer?

Mr. Penn—There is no doubt about that.

Mr. Starr—Wasn't the air so injurious that it would make you perspire, which is always the case with bad air. You will feel the heat much more than if you were in pure air? Now those are things that ought to be taken into consideration in heating with gas.

Mr. Penn—In regard to the room, the window, of course, was on the south side of the building. There is a balcony over that window and the sun did not have a fair chance at it. I do not know that that has very much to do with it. I notice that the heat is about the same in all parts of the room; and you will notice particularly that the heat at the floor is more pleasant, more agreeable, to a person sitting in a room than it is with any other heat I have ever tried. Of course I didn't test all the different parts of the room with the thermometer, but I made sufficient tests to satisfy me.

Mr. Starr—I have always been an advocate of the practice of cooking with gas, but never of heating with gas. That is the reason I asked the question.

Mr. Tayler—I burned one of those heaters in my office for about two weeks, night and day, just to test the question of the heater more than anything else, and I found no unpleasantness resulting from it. I have made no test except as to the measurement of gas used, which was 15 feet an hour. It seems to me that the gentlemen don't understand this heater. There is what they call a radiator. The back is hollow, made of cast iron, and water is poured into it, and the lower part is heated by the flame and the steam circulates around and comes back. There is no outlet in that. In addition to that is a pan which sets under the burner. So far as the deposit on the windows is concerned, I noticed no more of that than I did when burning with a reflector in the grate and with an opening up the chimney. However, it was not the coldest part of the winter. I think it was early in November when I used it.

Mr. Shelton—If there is to be no further discussion upon this paper, I move a vote of thanks to Mr. Penn for making this sacrifice of his pocketbook in the interest of science—50,000 feet a month. (Adopted.)

[To be continued.]

[Prepared for the JOURNAL.]

A Peculiar Gas-Electric Accident at Indianapolis, Ind.

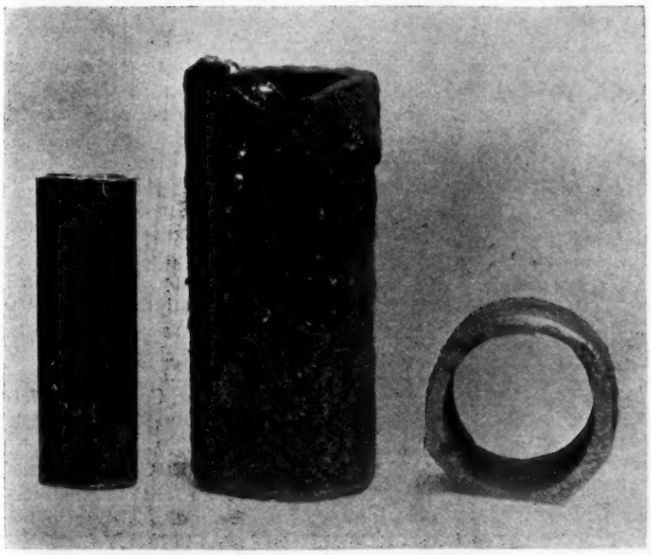
By MR. JOHN R. PEARSON.

I have been interested in the articles published in your paper on March 6 and 13, 1893, regarding the subject that I am going to write about. We had a peculiar accident to one of our natural gas mains, caused by the trolley system used by the Citizens Street Railroad Company of our city. I will mail you a photograph (see illustration) of the pipes as they were taken from the ground, also a view of the cast iron pipe which had been laid by the Indianapolis Gas Company in 1852, nearly 42 years ago. On account of the pipe having become too small, a larger one was laid, and although the one of which I send you a photograph was abandoned 22 years ago, we found it in as good condition as the day it was laid.

I beg to give you my opinion as to the cause of the accident. Indianapolis, as to the section noted, is located on very sandy soil, a few feet

of dirt covering forming the surface soil. Illinois street has been improved with asphalt pavement, which necessitates the concreting of the street to the depth of 8 inches before the asphalt is laid on. The concrete and asphalt render the street impervious to moisture, hence the earth and sand, for the distance of several feet below the street, form a very poor conductor. When the leak of electricity from the iron pole of the street car made its way to the ground, there was no way through the ground for it to return by the ground circuit to the power house. Owing to the dryness of the earth, as above described, the base of the iron street car pole being in contact with our old, abandoned cast iron gas pipe, and the fact that the iron gas pipe was corroded, as was also the street car pole, rendered the contact between the two so poor that necessarily the current in passing from one to the other created an arc, the same as an arc in one of the street lights.

As the electric arc heat is the most intense heat that it is possible to obtain, hence the current, in making this arc, melted the cast iron pipe, also the bottom of the street car pole, in its path to find a ground, which it did, following the cast iron pipe for about 300 feet north. At this point it encountered a wrought iron natural gas pipe, that crossed the cast iron pipe, which furnished the ground sought for by the current. The same conditions existed where the abandoned artificial gas pipe crossed the service pipe, extending to the base of the pole. The natural



gas pipe was to some extent also corroded, hence the current, in its seeking a ground through the natural gas main, created an arc, melting both the pipes, about the same as had occurred at the base of the street car pole. The natural gas then followed along the old artificial main, until it reached the street car pole that was melted by the arc, passed up through the center of the pole and escaped into the air.

The first car that passed over and the trolley created a spark, that set fire to the natural gas, the flame from which leaped into the air 15 feet, melting the main current wires in a few minutes, and stopping all cars on the line for several hours.

My object in writing you this letter is from the fact that, as all large cities are adopting the electric car system, I fear that grave results will occur to water and gas mains, unless some better means are adopted than are now used to return the current back to the generator station. In our case it would have been a very serious matter to us if the natural gas had found its way into the cellars or basements of the large blocks adjacent, instead of coming out at the top of the pole; for then there would certainly have been an explosion, with great damage to life and property.

Powdered Coal in Gas Works.

[By Mr. N. H. Humphrys, in the London *Journal*.]

In a "Note" on "Coke from Powdered Coal," which appeared in the *Journal* for Jan. 24 last, it was stated that "no record exists of the effect of pulverizing coal upon its gas making qualities. Dust coal was formerly objected to by gas managers, mainly on account of the difficulty of keeping up retort heats with it. With the use of gas furnaces, however, there can be little force in this traditional objection."

It is some 13 years since I tried the effect of using finely ground coal, with a view of manufacturing a good quality of furnace coke. These experiments were carried out at a small gas works, with a bed of three 15-inch round retorts, as in regular use for the production of gas; and as far as possible, under similar conditions as to temperature of distillation. A level gauge was maintained at the hydraulic in each case; the registration of the station meter was taken every hour; and the results were calculated out to "per ton" for convenience of comparison. The same class of coal was used in both experiments; but it should be noted that the ground coal was prepared from "small," and not from the sample as used. It will be seen from the table below that the screened coal could be worked off in six hours, or at the rate of four charges per diem, yielding 15,600 cubic feet of gas; whereas the ground coal could only be worked at the rate of three charges per diem, yielding 9,010 cubic feet. The consumption of fuel, and the labor, would be practically the same in each case. A considerable increase in the yield of coke, and also a great improvement in quality, was obtained from the ground coal. It was apparently equal to good furnace coke. But the reduced yield per ton and make per mouthpiece showed conclusively that the ground coal was entirely unsuited for ordinary gas works operations. No improvement in the quality of the gas produced followed with the diminished yield.

Make of Gas.	Small, Ground to Powder. 2½-Cwt. Charges.	Screened Gas Coal. 2½-Cwt. Charges.
First hour	620 cubic feet	1,600 cubic feet.
Second hour	960 "	1,960 "
Third hour	1,440 "	1,880 "
Fourth hour	1,500 "	1,880 "
Fifth hour	1,590 "	1,640 "
Sixth hour	1,410 "	1,440 "
Seventh hour	990 "	stopped.
Eighth hour	280 "	
	stopped.	
Total make per ton	8,790 cubic feet	10,400 cubic feet.
Coke	15¼ cwt.	13¼ cwt.

Production per day—

9 charges = 20¼ cwt. 9,010 cubic feet.

12 " = 30 " 15,600 cubic feet.

From this it would appear that the traditional objection is well founded. Even if the results had been satisfactory, it would be impossible to work the ground coal in the usual way. After introducing three charges with the scoop, the air was opaque with dust, and the stokers were covered with it, and suffered considerable discomfort. No flame issued from the retort when the charge was put in; and the temperature was so far lowered that the meter did not move at all for several minutes after the introduction of the charge.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE proprietors of the Derby Gas Company, of Birmingham, Conn., evidently have determined to keep their Treasurer and Agent, Mr. Charles H. Nettleton, up to the business mark this season, for they recently authorized him to make the following contracts: With Messrs. Deily & Fowler, of Philadelphia, for a 200,000 cubic foot capacity holder, to rest in an iron tank, and with the United Gas Improvement Company for one 6-foot set of water gas apparatus. These betterments will be completed prior to September 1st.

SOME days ago the Foreign and Domestic News Company, of this city, reported "special news" from Chicago to the effect that the Mutual Gas Company, of Hyde Park, had decided to abandon the manufacture and supply of fuel water gas, substituting therefor a gas manufactured under commonsense methods of procedure. The despatch also said, "The Mutual Company's territory covers all of the World's Fair district."

THE Berlin Iron Bridge Company, of East Berlin, Conn., has received the contract for a new bridge at Norwich, Conn., to span the tracks of the Norwich and Worcester branch of the N. Y. and N. E. Railroad over the Shetucket river. The bridge, which is to be of single span type, of 145 feet, is arranged for a roadway 25 feet wide in the clear, and two sidewalks, each 5 feet wide in the clear. Both roadway and sidewalks will be covered with steel buckle plates and concrete.

THE Committee on Manufactures, of the Massachusetts Legislature, has reported favorably a bill allowing gas companies to increase their

capital stock to the full value of the property, the increase, however, to be subject to the approval of the Board of Gas and Electric Light Commissioners.

A CORRESPONDENT at Montreal forwards the following: "Notice is given in the Canada *Gazette* that application has been made to the Governor in Council for a charter of incorporation by letters patent under the provisions of the 'Companies' Act,' revised statutes of Canada, chapter 119, for the incorporation of the applicants and all such other persons as may become shareholders in the proposed Company, to be known as the Auer Light Company, Limited. The purposes of the Company are to be the construction, erection and maintenance of works and apparatus for generating and producing artificial light and heat, and generally, the manufacturing of and dealing in devices, fittings, improvements and combinations for illuminating and heating purposes. The capital stock is to be $1,000,000, divided into 10,000 shares of $100 each. The applicants are Messrs. A. A. Ayer, H. J. Bell, E. H. Botterell, F. W. Campbell, Gilman Cheney, A. Desjardins, G. C. Dunlop, S. Finlay, John Farquharson, Jas. Gardner, A. S. Hamelin, Harold Lawton, John McKergow, John Murphy, F. E. Nelson, Wm. Strachan, J. W. Tesler, W. J. White, J. Brooks Young and A. O. Granger. So far (up to March 24) the Company has not issued any printed prospectus setting forth the merits or advantages of the Company as an investment, but investors are being solicited to take stock in the new incorporation. The Montreal *Herald* claims, however, to have made the following discoveries respecting the Company: The capital stock is nominally $1,000,000, but for the present only 7,500 shares will be issued, which will be offered at $35 per share for full-paid unassessable stock. It is understood that the Company will pay $110,000 to Mr. Granger for his patents, divided as follows: $22,500 in cash and 2,500 shares of stock, which, at the issuing price, will be worth $87,600. In addition to this, Mr. Granger is to receive 500 shares of the remaining 2,500 whenever they are put upon the market. Inquiry at the parent Company's office elicited the information that orders for the installation of the light are coming in rapidly, and that the Company's prospects of doing a large business are good. The contract for the use of lights by paying to the Company an amount equal to 50 per cent. of the consumers' reduced gas bills was not a popular one, and is being abandoned for one which calls for a simple rental of $1 a year for the use of the fixtures and 75 cents each for the mantles, upon payment of which the mantles become the property of the purchaser. Prof. Bell, the Company's Superintendent, is also introducing colored globes for use in halls, drawing rooms and other places where an intense white light is objectionable."

MR. F. A. REICH, writing to the JOURNAL, from Salt Lake City, under date of March 24th, says: "A meeting of the City Council will be convened for the purpose of discussing the question of granting a franchise to Wendell Benson and others to manufacture gas and to use and occupy the streets, lanes and alleys and other public places of the city for the purpose of conveying electrical currents by means of pipes or conduits, laid or to be laid below the surface of the ground, or by means of wires or conductors placed above the streets, to be used for electrical lighting and furnishing power, and also pipes to be laid below the surface of the ground for the conveyance of steam for heating, furnishing power and other purposes, to property owners and users in Salt Lake City, for a term of 25 years. They also offer to furnish gas to the citizens at a price not exceeding $1.75 per 1,000 cubic feet, if paid on or before the 10th day of each month, and agree to light the City Council chamber and the offices of the several departments of the city government free of charge. Mr. Benson also agrees to furnishing an illuminating gas of not less than 18 candle power and incandescent electric light of not less than 16 candle power, the same to be subject to the inspection of a proper officer appointed by the City Council to determine the quality of the gas and electric light. Work on the construction of the plant, according to the franchise, shall be begun 90 days after the acceptance thereof, and shall be completed within 18 months thereafter." Mr. Reich adds that the Benson proposition is enveloped in a foggy sort of a veil, and the general impression among those interested in the artificial lighting supply of Salt Lake is that Benson and his allies are not over eager to go into the business for that which is to be made out of it in the ordinary way.

RUDOLPH W. WOSSLICH, a restaurant keeper at No. 167 Dearborn street, Chicago, has brought suit against the Chicago Gas Light and Coke Company, putting the damages which he seeks to recover at $25,000. At the complainant's figures, we must submit that Chicago cooks think pretty well of themselves; rather more than their customers appreciate what the cooks concoct, for instance. Aside from these speculations, however, the complainant avers he has been damaged in the sum named, because the Gas Company laid its pipes through his district in Dearborn street in a negligent manner. So negligently, in fact, that the rifts in the main joints allowed the gas an easy passage through the subsoil of the street into his kitchen and serving rooms, thereby sickening his *chef* and dishwashers and disgusting his customers. So he would wish recompense for the loss of health on the part of the former and alleviation for the missing link in the predilections of the latter for his hostelry.

IN the meantime, would it not seem to be eminently fair that the street faces of foundation walls should be tightly jointed or built, at least to the point that they would resist the interstitial ramblings or inquiries of escaping gas, whose chief aim, when in a wandering state, is to court the dissolution that awaits it when the outer air is reached.

THE Pittsburgh *Telegraph* says that a company has been started for the formation of a fuel gas plant between Braddock and Turtle Creek, Pa., the purpose being to supply a gas that can be used in place of natural gas for heating purposes. It is also said that the plant will be of a capacity for the supply of the adjoining hamlets of Port Perry and Wilmerding.

NOW it is another Company for Buffalo, N. Y.; papers incorporating the Peoples Gas Light Company for that city having been filed at Albany. The capital is put at $100,000.

MR. J. J. HUMPHREYS has been appointed Manager of the Ottawa (Canada) Gas Company, and assumed an active part in the position about a fortnight ago. It is understood that considerable additions will be made on the plant this season.

MESSRS. WILLIAM C. SPRUANCE and George S. Capelle, of the Wilmington (Del.) Coal Gas Company, and ex-State Senator A. B. Richardson, of the Dover (Del.) Gas Light Company, recently spoke at the State House, making a strong argument against the granting of a charter to the proposed Citizens Light and Power Company. The projectors of this Company have asked for a franchise sufficiently broad to enable them to operate either gas or electric lighting plants in any city or town of the State. They evidently do not desire to split a cherry.

AT the annual election of the East River (L. I.) Gas Company the following Directors were chosen: H. B. Hollins, Emanuel Lehman, B. I. H. Trask, W. F. Havemeyer, E. S. Knapp, E. E. Denniston, R. N. Young, Emerson McMillin and Chas. R. Flint. This Company is the controller of the enterprise to tunnel the East river for the transportation of or the conveying of gas from the east bank of the river to the west bank of the same—that is, from Ravenswood to New York City.

WRITING of this calls to mind a remark by Mr. C. H. Welch, in his address before the Ohio Gas Light Association (the full remarks will be found on page 473, second column, first paragraph), where he stated the following: "It may be mentioned in this connection, as one of the notable achievements of the age, the proposed installation of a water gas station of 24,000,000 cubic feet daily capacity on Long Island for supplying the great metropolis with this illuminating agent. This gigantic scheme is a creation of the 'Ohio man' and the founder of this Association." We presume that Mr. Welch refers to Mr. Emerson McMillin, and desires to give to that gentleman the credit of "creating" the tunnel scheme, and while we do not wish to detract one iota from Mr. McMillin's activity and enterprise in this connection, for undoubtedly more to him than to anyone else is to be accorded the acknowledgment that practically he has been the active suggester of the present state of the work, it is nevertheless true that the scheme did not originate with him. When the Legislature granted to the Standard Gas Light Company of this city a charter, the moving spirit in the enterprise (Mr. Wallace C. Andrews) declared that it would be a good move to construct the works at Ravenswood, and to convey the gas manufactured there for distribution in New York City by means of a tunnel under the bed of the East River. So convinced was Mr. Andrews of the feasibility of the scheme that he purchased 40 lots of ground at Ravenswood, intending to dispose of the same to the Standard Company as a site for its works. The late Mr. Flannery, who was the Company's Chief Engineer, was directed to make the necessary estimates of probable cost, etc., and this he did, after having gone into the conditions with great minuteness. His report was so unfavorable, chiefly because of the large expenditure necessary to carry out the undertaking, that the project was abandoned. We may also say that the property purchased at Ravenswood still stands in the name of Mr. Andrews.

THE Wiscoy (Allegheny county, N. Y.) Gas and Mineral Company has been incorporated by Messrs. C. S. Crandall, H. H. Clute, A. E. Whitney and A. J. Oakley, and Lucinda M. Hills.

THE plant of the Troy (N.Y.) Gas Company, in the upper part of the city, is to be thoroughly overhauled.

MR. OWEN HITCHINS, for many years a Director in the Frostburg (Md.) Gas and Electric Light Company, is dead. The Board, at a special meeting, adopted the following resolution respecting him:

"*Resolved*, That the Directors of this Company desire to spread upon the minutes their sense of the loss they sustain individually and as a Company in the death of Mr. Owen Hitchins. Connected with the Company, as he had been as a stockholder from its inception, and for many years adviser and Director, he displayed in the management of its affairs the same sterling fidelity, intelligent conservatism and well-directed energy which made him a wise counsellor and citizen and a trusty friend, thus causing his death to be a loss that will be felt not only by his business associates, but by his city, his county and his State."

AN interesting case is reported in the Chicago newspapers, that tried recently before Judge Everett and a jury, in which the Chicago Economic Fuel Gas Company attempted to recover payment for 200,000 cubic feet of gas supplied to the apartment house of William A. Bangor, located on 39th street. Bangor's defense was that he had made a contract with the Company to supply gas to his building, the Company guaranteeing that 16,000 cubic feet of its gas would yield a heating effect at least equal to that produced by the combustion of a ton of coal. He asserted that this guarantee was not even approached in practice, and pointed out that he was put to considerable expense in changing his furnaces to make them suitable for the use of gaseous fuel, and that while every attention was paid to giving the gas a fair trial, nothing like a satisfactory heat could be obtained. The Company presented its bill, which Bangor refused to pay until everything worked satisfactorily. The Company then cut off the gas supply, at a time when the weather was very cold, which caused the tenants to suffer greatly for two days, or until the furnaces could be restored to a coal burning basis. Bangor then put in a counter claim for damages. The jury sided with him, awarding him damages in the sum of $156.30.

THE works of the Manistee (Mich.) Gas Light and Coke Company, which were completed in 1882, are of a very compact order, and are the property of Mr. Louis Sands. The daily capacity is 40,000 cubic feet, and the output increases constantly. Twelve miles of mains are operated and the plant is efficiently superintended by Mr. B. J. Stall. An electric lighting annex was added in 1890, the current having been first sent out on Christmas Eve of that year. The building is a substantial brick structure, and holds a 300 horse power Reynolds-Corliss engine and 4 Brush electric dynamos of 65 arc light capacity and one 1,000 incandescent light machine. The arc lamps are all of the Brush-Adams type. A lofty lookout tower is provided to enable the electrician to look to his street lights, and also enables him to signal by night to linemen engaged along the wire. Thirty-six miles of wire and 65 poles conduct the circuit. The plant cost $95,000.

AT a meeting of the Pawtucket (R. I.) Common Council, Mr. Delany presented a resolution (which was subsequently adopted), providing for the appointment of a joint special committee of five, to consist of the Mayor, the President of the Common Council, one Alderman, to be appointed by the Mayor, the Chairman of the joint committee (standing) on street lights, and one member of the Common Council, to be appointed by the President of that body, for the purpose of inquiring into the matter of a municipal lighting plant, the cost of building it, the cost of producing and maintaining an efficient lighting service adapted to the present and future needs of the city, and to furnish and relate to the city such other information relative thereto as will enable the Council to best determine what action to take in the premises, and to report to the City Council, or either branch thereof, as soon as may be.

A. RAPP, of Montezuma, Iowa, has instituted a suit for $15,000 damages against the Davenport (Iowa) Gas Company, plaintiff seeking to recover this sum because of the death of his son, who was suffocated by inhaling illuminating gas during his stay at a hotel in Davenport. Plaintiff alleges that the Company is responsible in that the accident happened after it had been notified of a leak in the pipes, and that it failed to remedy the disarrangement.

THE Wilcox Light and Heat Company, with a capital of $50,000, has been incorporated to transact business at Grand Rapids, Mich.

THE De Pere (Wis.) Electric Light and Power Company has been incorporated by Messrs. John Dousman, William Armstrong, C. G. Wilcox, and J. B. Chase. It is capitalized in $20,000. It is possible that the proprietors will also ask for the right to construct and operate a gas works. This place is in De Pere township, Brown county, Wis., at a point on the Fox river 6 miles from its mouth. It is reached by the Wisconsin Central Railroad, and the Chicago and Northwestern. It is 23 miles northeast of Appleton and 4 miles southwest of Green Bay. It is connected with the town of West De Pere by a bridge over the Fox river. The population of De Pere and West De Pere will not exceed 7,000 souls.

WE are indebted to a correspondent at Kingston, N. Y., for the following: "For some time past negotiations have been pending for the consolidation of the gas and electric light works of Catskill, N. Y. The proposition of the Gas Company was that in the event of a consolidation they would control the new Company, but this the electric light folks would not accede to. Finally an option on the gas works was secured, and on March 20th a contract was made under which the Catskill Illuminating and Power Company is to buy the gas works for $40,000. The electric light plant has not been doing a paying business, and it is the intention of the Company, now that it controls the gas works also, to so 'adjust' its rates that the shareholders will get something on the money invested. The Gas Company was composed of Judge Mattice, who owned a one-half interest, and E. A. Chase and William J. Hughes, who jointly owned the other half. When they bought the gas works the price paid was $22,000, but since that time the plant has been greatly extended and improved. The new holder, which stands adjoining the Nelida Theater, cost about $8,000, so that the present sales price is not an exorbitant one. While it is the intention of the electric light company to adjust its business so as to make it a profitable one, the public need have no fear that they will be unjustly dealt with."

THE Detroit *Free Press* says that to accommodate the users of gas in their payments therefor, the three Gas Companies have united their departments into one general office, which will be located at 42 West Congress street, formerly the office of the Detroit Gas Light Company, on April 1st. The bills for illuminating gas in the western district of the city will be due from the 10th to the 20th of each month, and in the eastern district from the 20th to the 30th of the month. The price of gas has been placed at $1.75 per 1,000 cubic feet, with a discount of 50 cents per 1,000 if paid before the expiration of time allowed for final settlement each month.

IN a recent interview Director Windrim placed himself on record favoring the movement looking toward the removal of the Ninth Ward gas works of Philadelphia from its present location, which is in the center of the city. Said he: "Over a year ago I recommended in my annual report that the 26th Ward works should be so extended and enlarged as to have a sufficient capacity to allow us to do away with the works in the heart of the city. There is every facility down there for the work, plenty of land, and nobody to be annoyed by the smell. I would not favor the sale of the present Ninth Ward works, however, but utilize it for holders and reservoirs. It is the manufacture of gas which is objectionable, and not the mere storing of it in tanks. The present site is low and admirably adapted for distribution purposes. We need holders in various sections of the city in order to equalize the pressure in distribution, and no better site could be secured than the present location at 23d and Market, while the removal of the manufacturing process would relieve the neighborhood of the objectionable features. The only thing needed is an appropriation by Councils to enlarge the 26th Ward works."

THE Nyack (N. Y.) gas works will be rebuilt. Owner Voorhis is confident that is the right thing to do. And so say we.

THE proprietors of the Newport (R. I.) Gas Light Company are about to improve their property on Thames street, and would have carried this thing out several years ago, were it not for the thought that the authorities would eventually widen the street in question.

AT the annual meeting of the Middletown (Conn.) Gas Company the following officers were chosen: President, the Hon. A. B. Calef; Secretary and Treasurer, H. L. Mansfield; Superintendent, J. H. Jones; Assistant Superintendent, S. D. Clark; Directors, Benjamin Douglas, A. B. Calef, W. T. Elmer, W. H. Burrows, S. B. Hubbard, Henry Woodward, H. L. Mansfield, E. H. Hubbard and Wm. Wilcox.

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AGENTS

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MONDAY, APRIL 3, 1893.

The Market for Gas Securities.

The advance in Consolidated for the week ended yesterday (Thursday, the Exchange is closed to-day, Friday) was 3¼ points, the closing price being 131½, as against the opening price of Friday last of 127¼. There is every likelihood that Consolidated will go to 145 before July 1. Equitable and Mutual are in good demand, but little stock is offering in either. As we remarked last week, there does not seem to be much life left in the dollar gas bill, and with that out of the way every city gas stock ought to be a purchase. During the week another sharp decline was experienced in Brooklyn securities, the only one that held its strength having been Nassau, which is offered at 170. Williamsburgh, too, did fairly well, the bid price being 155. The situation in Brooklyn is very uneven, and a fortnight or so ought to bring us much nearer to a solution of the problem. Bay State has advanced to 33, and Chicago gas is at 89¼ to 89½. Baltimore Consolidated is up to 63, and we again repeat that the shares are a purchase.

The United Gas Improvement Company has declared a quarterly dividend of 2 per cent., payable April 15.

Advertisers Index.

GAS ENGINEERS. Page

Jos. R. Thomas, New York City ... 493
Wm. Henry White, New York City ... 499
Fred. Bredel, New York City ... 495
H. C. Slaney, New York City ... 493
Frederic Egner & Co., St. Louis, Mo ... 498
Geo. R. Rowland, Brooklyn, N. Y. ... 493
Jas. R. Smedberg, Chicago, Ills ... 493

CHEMISTS.

Durand Woodman, New York City ... 484

PROCESSES.

National Gas Light and Fuel Co., Chicago, Ills ... 490
Bartlett, Hayward & Co., Baltimore, Md ... 497
United Gas Improvement Co., Phila, Pa ... 489
Burdett Loomis, Hartford, Conn ... 499
National Gas and Water Co., Chicago, Ills ... 491

GAS WORKS APPARATUS AND CONSTRUCTION.

James R. Floyd & Sons, New York City ... 499
Continental Iron Works, Brooklyn, N. Y ... 484
Deily & Fowler, Phila., Pa ... 499
Kerr Murray Mfg. Co., Fort Wayne, Ind ... 496
Stacey Mfg. Co., Cincinnati, Ohio ... 499
Bartlett, Hayward & Co., Baltimore, Md ... 497
Davis & Farnum Mfg. Co., Waltham, Mass ... 496
R. D. Wood & Co., Phila., Pa ... 498
Bouton Foundry Co., Chicago, Ills ... 499
Isbell-Porter Company, New York City ... 498
Fred. Bredel, New York City ... 495
United Gas Improvement Co., Phila., Pa ... 489
National Gas Light and Fuel Co., Chicago, Ills ... 490
Berlin Iron Bridge Company East Berlin, Conn ... 486
National Gas and Water Co., Chicago, Ills ... 491
The Gas Works Construction Co., New York City ... 483
Frederic Egner & Co., St. Louis, Mo ... 498

GAS AND WATER PIPES.

Mellert Foundry and Machine Co., Reading, Pa. (John Fox, Selling Agent, N. Y.) ... 501
Ohio Pipe Co., Columbus, Ohio ... 501
M. J. Drummond, New York City ... 501
R. D. Wood & Co., Phila., Pa ... 498
Warren Foundry & Machine Co., New York City ... 501
Donaldson Iron Co., Emaus, Pa ... 501
Addyston Pipe and Steel Co., Cincinnati, O. ... 501

STEAM BLOWER FOR BURNING BREEZE.

H. E. Parson, New York City ... 495

GAS COALS.

Penn Gas Coal Co., Phila., Pa ... 498
Perkins & Co., New York City ... 492
Despard Coal Coal, Baltimore, Md ... 493
Chesapeake and Ohio R. R. Coal Agency, N. Y. City ... 493
Westmoreland Coal Company, Phila., Pa ... 495
J. & W. Wood, New York City ... 492
Henry C. Scheel, New York City ... 429

CANNEL COALS.

Perkins & Co., New York City ... 497
J. & W. Wood, New York City ... 492
Wm. Hopper, Resident Director, Louisville, Ky ... 497

GAS ENRICHERS.

Standard Oil Co., Cleveland, Ohio ... 493

COKE CRUSHER.

C. M. Keller, Columbus, Ind ... 492

INCLINED RETORTS.

Parker-Russell M'fning and Mfg. Co., St. Louis, Mo ... 494

RETORTS AND FIREBRICK.

J. H. Gautier & Co., Jersey City, N. J ... 494
B. Kreischer & Sons, New York City ... 494
Adam Weber, New York City ... 494
Laclede Fire Brick Mfg. Co., St. Louis, Mo ... 494
Borgner & O'Brien, Phila., Pa ... 494
James Gardner, Jr., Pittsburgh, Pa ... 494
Henry Maurer & Son, New York City ... 494
Baltimore Retort and Fire Brick Co., Baltimore, Md ... 494
Parker-Russell Mining and Mfg. Co., St. Louis, Mo ... 494
Brooklyn Fire Brick Works, Brooklyn, N. Y ... 494

GASHOLDER TANKS.

W. C. Whyte, New York City ... 490
J. P. Whittier, Brooklyn, N. Y ... 488

GASHOLDER PAINT.

The Government Waterproof Paint Co., Boston, Mass ... 483

CEMENTS.

C. L. Gerould & Co., Brooklyn, N. Y ... 494

SCRUBBERS AND CONDENSERS.

G. Shepard Page's Sons, New York City ... 488
R. D. Wood & Co., Phila., Pa ... 498
James R. Floyd & Sons, New York City ... 500
Continental Iron Works, Brooklyn, N. Y ... 484

REGENERATIVE FURNACES.

Bartlett, Hayward & Co., Baltimore, Md ... 497
Fred. Bredel, New York City ... 495
J. H. Gautier & Co., Jersey City, N. J ... 495
Parker-Russell Mining and Mfg. Co., St. Louis, Mo ... 494

GAS GOVERNORS.

Connelly Iron Sponge and Governor Co., New York City ... 491
Wilbraham Baker Blower Co., Phila., Pa ... 491

GAS GAUGES.

The Bristols' M'f'g. Co., Waterbury, Conn ... 483

TAR AND CARBONIC ACID EXTRACTOR.

Geo. Shepard Page's Sons, N. Y. City ... 452

AMMONIA CONCENTRATOR.

Michigan Ammonia Works, Detroit, Mich ... 483

GAS METERS.

John J. Griffin & Co., Phila., Pa ... 502
American Meter Co., New York and Philadelphia ... 503
The Goodwin Meter Co., Philadelphia, Pa ... 468
Helme & McIlhenny, Phila, Pa ... 503
D. McDonald & Co., Albany, N. Y ... 503
Nathaniel Tufts, Boston, Mass ... 502
Maryland Meter and Manufacturing Co., Baltimore, Md ... 502
Harris Bros. & Co., Philadelphia, Pa ... 502
Keystone Meter Co, Royersford, Pa ... 503
Metric Metal Co, Erie, Pa ... 501

SELF-SEALING MOUTHPIECE DOORS.

Isbell-Porter Company, New York City ... 498
Continental Iron Works, Brooklyn, N. Y ... 484

INCANDESCENT GAS LAMPS.

Welsbach Light Co., Gloucester City, N. J ... 486

BURNERS.

C. A. Gefrorer, Phila., Pa ... 483
Moses G. Wilder, Phila., Pa ... 483

STREET LAMPS.

J. G. Miner, Morrisania, New York City ... 495
Bartlett Street Lamp Mfg. Co., New York City ... 495

PURIFYING MATERIAL.

Connelly Iron Sponge and Governor Co., New York City ... 491
Greenpoint Chemical Works, Brooklyn, N. Y ... 491
Henry W. Douglas, Ann Arbor, Mich ... 491

ELECTRICAL APPARATUS.

Wm. Henry White, N. Y. City ... 499
Fort Wayne Electric Co., Fort Wayne, Ind ... 267

EXHAUSTERS.

The P. H. & F. M. Roots Co., Connersville, Ind ... 452
Isbell-Porter Company, New York City ... 498
Wilbraham Baker Blower Co., Philadelphia, Pa ... 491
Connelly Iron Sponge and Governor Co., New York City ... 491

VALVES.

Ludlow Valve Manufacturing Co., Troy, N. Y ... 483
Chapman Valve Manufacturing Co., Boston, Mass ... 483
R. D. Wood & Co., Phila., Pa ... 498
The P. H. & F. M. Roots Co., Connersville, Ind ... 488
Continental Iron Works, Brooklyn, N. Y ... 484

GAS ENGINES.

Schleicher, Schumm & Co., Phila., Pa ... 504

ENGINES AND BOILERS.

The Hazelton Boiler Co, New York City ... 485

PURIFIER SCREENS.

John Cabot, New York City ... 483

GAS STOVES.

American Meter Co., New York and Philadelphia ... 487
The Goodwin Meter Co, Phila., Pa ... 468
George M. Clark & Co., Chicago, Ills ... 485
Maryland Meter and Manufacturing Co., Baltimore, Md ... 502
The Schneider & Trenkamp Co., Cleveland, O ... 484

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